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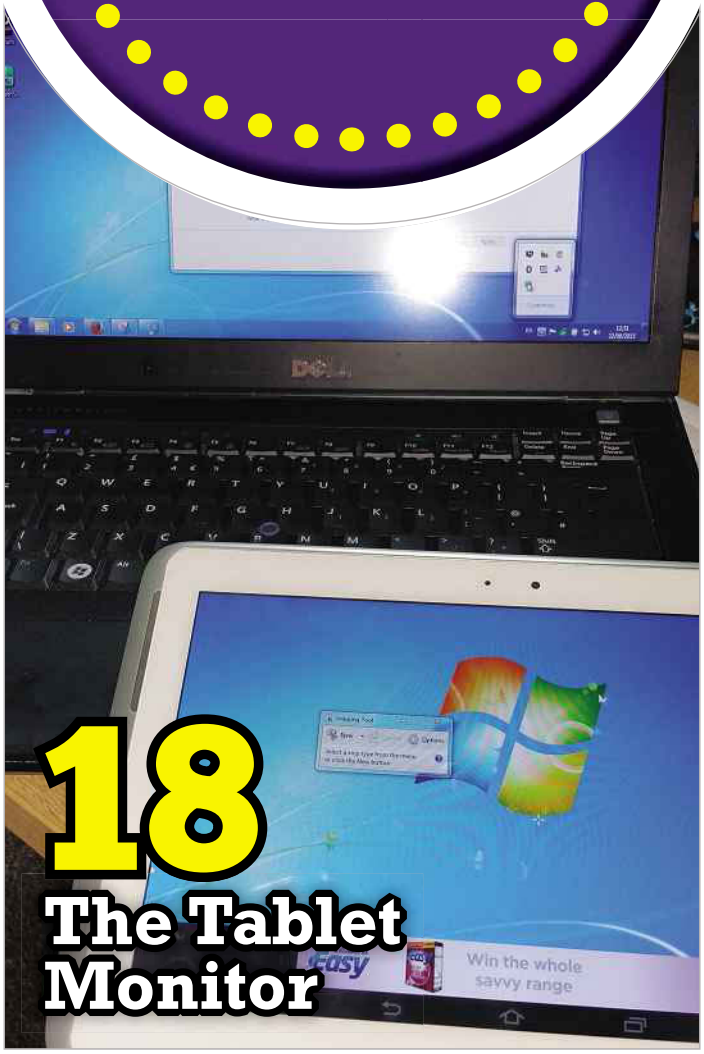
Contents

This week...



08 The Apple Backlash

In spite of Apple's enormous success and massive profits, it's always attracted criticism. Its biggest fans might put that down to jealously, but surely there's more to it than that? David Crookes examines the latest problems it seems to be facing and wonders how many of them are of the firm's own making

18 The Tablet Monitor

Having a second monitor can greatly increase productivity, but unless you're using it every day, it's possibly not a cost you can justify. There is, however, a chance you already own a second screen. If you have a tablet, then you can run special apps that will allow you to use it as a monitor for a PC. David Hayward has been looking at the options

24 Computing Days Out

Have your family been nagging you to stop looking at your computer and to get outside? Well, that's the perfect opportunity to take them all out on a trip to look a whole different bunch of computers, in one of the many technology events that are running up and down the country. Join us as we take a look at the kind of things you can enjoy

46 Motherboards Tested

It's no secret we like saving money, but that doesn't mean we aren't interested in looking at high-end components as well. And when it comes to motherboards, there's no shortage of boards that will set you back a couple of hundred quid in exchange for high-quality parts and performance. We've been looking at six of them this week, and putting them through their paces

46 Motherboards Tested

56 Elop and Microsoft

56 Elop And Microsoft

When Stephen Elop took charge of Nokia, it was doing badly. Then, under his leadership, it did even worse. Now, though, after collecting an obscene amount of money on the way, he's finally been shown the door, but will he be gone for long? Mark Pickavance looks at this man's achievements (or lack thereof) and ponders what his legacy might be

60 Are Touchscreens A Waste Of Time?

Ever since smartphones and tablets became everyday devices, technology manufacturers have been trying to convince us that everything must have a touchscreen. That includes PC monitors and laptops. But do you actually need one? Are they really worth what you pay for them? Roland Waddilove has been finding out

Also In This Issue...

29 Top 5
We nominate our favourite spam emails

30 Remembering
Join us as we salute a miner known to be manic

31 Component Watch
Keep cool with our selection of CPU fan deals

66 Too Much Hacking
David Hayward might be paranoid, but everyone is watching him

86 Crowdfunding Corner
James turns the spotlight on two more projects

87 App Of The Week
Want to make a collage? We've got the app for you!

Group Test

Top Of The Range Motherboards

46 Gigabyte X99 Gaming 5P
47 MSI Z97 XPower AC
48 MSI X99A XPower AC
49 ASRock Z97 Extreme9
50 Gigabyte Z97X-SOC Force
51 ASRock Fatal1ty X99X Killer
52 Sum up

Reviews

38 Brother DCP-J4120DW
39 MSI R7 370 Gaming 2G Graphics Card
40 HP Spectre x360 Convertible Laptop
42 Intel NUC NUC5i5RYK Intel Core i5-5250U arebones
43 SteelSeries Siberia Elite Prism Gaming Headset
44 Sharkoon Shark Zone H40 Headset

Experts

82 Ask Aaron
84 Ask Jason

Specialists

68 Linux Mart
69 Mac Mart
70 Mobile Mart
71 Hardware Mart
72 Gaming Mart

News

32 The Latest News
53 Your Letters

Regulars

54 Subscriptions
74 Ad Index
76 IT Essentials
78 Classifieds
88 Logging Off

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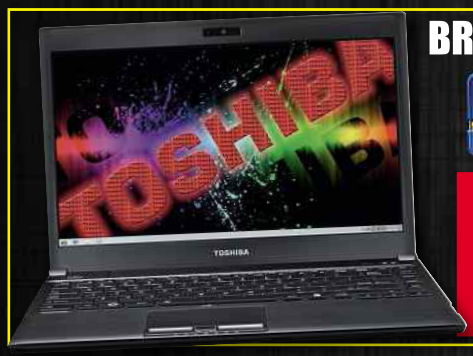

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The Apple Backlash

People have been queuing up to take a bite out of Apple... But why? **David Crookes** looks at the core issues

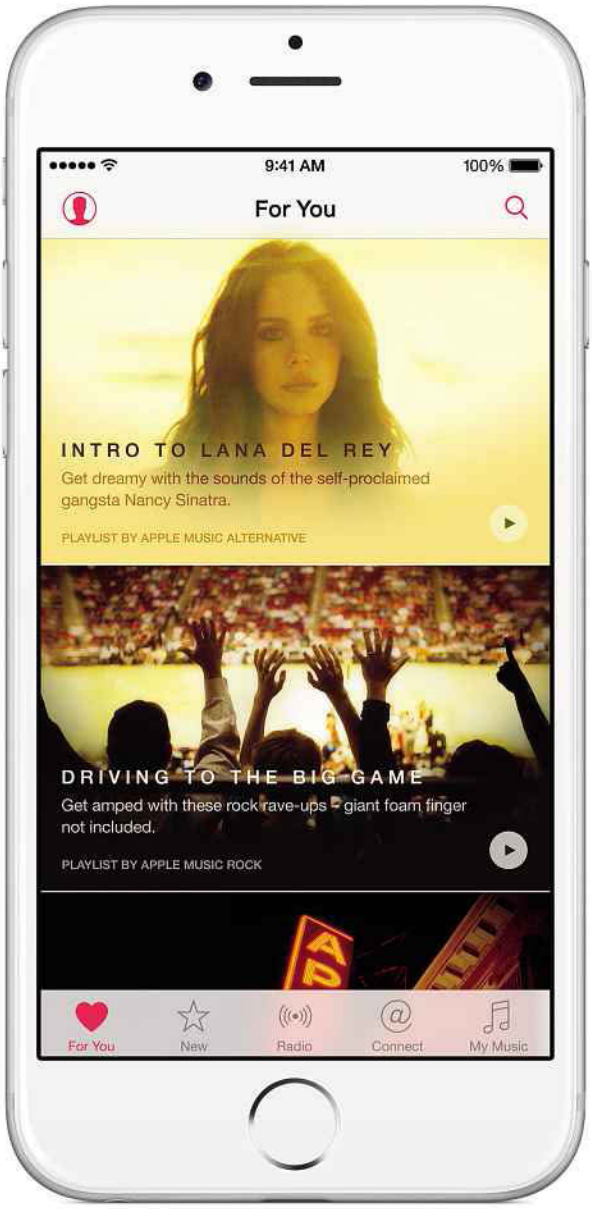
In 1981, the British synthpop group, The Human League, released a song called *Don't You Want Me*. It was a bitter conflicting duet that has been described as a "devastating chronicle of a frayed romance". Today, though, the tune could so easily be the backdrop to Apple's rollercoaster relationship with music.

For the line, "I shook you up and turned you around, turned you into someone new," could be an acid-tongued reminder that music has played a fundamental part in Apple's prominent rise. This has been the case since 2001, when iTunes was released on the Mac, followed by the iPod some nine months later. Since then, as sales of physical music have fallen and downloads have become standard, Apple has had the world at its feet. "Success has been so easy for you" indeed.

Yet just as music has helped Apple rise like a crescendo, it has also caused it to hit some bum notes. Legions of iTunes users hate the software, and it has led to many an article listing the 'top 10 reasons iTunes sucks'. Likewise, last year, the world had a less than beautiful day when 500 million iTunes accounts suddenly saw a new entry: U2's album *Songs of Innocence*. It may have been a free gift, but it was also Apple's most expensive gaffe: a $100 million disaster which set punters on edge.

It's worth noting that music has been both a petal and a thorn for Apple for as long as we can remember. In the late 1970s, it became embroiled

"This is about the new artist or band that has just released their first single"



Apple Music launched earlier this week, but it has already been the subject of musician-led backlash

in a long-running legal dispute with Apple Corps, the company owned by The Beatles, over competing trademark rights. Then last December it was revealed that Apple had, many years before, deleted songs off customer iPods that had not been purchased from iTunes. This, as you would expect, caused something of a furore.

Each time something like this flares, the message from music fans seems to be clear: "Don't forget it's me who put you where you are now and I can put you back there too." That seemed, once more, to be the general consensus when singer Taylor Swift recently rebuked the company over the way it's seeking to run its new streaming service, Apple Music, unveiled at the beginning of June.

Back then, the company spending 30 minutes showing off its features while also allowing Apple VP Eddy Cue to indulge in an uncomfortable dance. The company was elated that it had secured the signatures of some very important record label execs and it celebrated by inviting rapper Drake on to the stage to blast out a choon. Pundits praised the venture, saying it would provide strong, healthy competition for Spotify. But musicians, including Swift, decided they didn't want to throw their entire hand into the venture.

Swift announced that she was holding back her album, *1989*, from the streaming service, venting her frustration that Apple Music was offering a three-month trial to anyone who signs up. The 25-year-old explained that "Apple Music will not be paying writers, producers, or artists for those three months." She added: "I find it to be shocking, disappointing, and completely unlike this historically progressive and generous company."

The letter was carefully worded – most probably by the singer's 'people' – so as not to unduly upset Apple (perhaps an indication that, for all of the issues music may have with the company, the industry would suffer a gaping financial hole without its support). Nevertheless, it hit the right notes. Swift claimed to be speaking out on behalf of new artists who will not be paid for those initial months.

"This is not about me," she wrote. "Thankfully I am on my fifth album and can support myself, my band, crew, and entire management team by playing live shows. This is about the new artist or band that has just released their first single and will not be paid for its success". She also added for good measure: "These are not the complaints of a spoiled, petulant child."

The singer, whose back catalogue was always going to be made available on Apple Music (this spat only related to *1989*), played a blinder. A few days before she released her open letter to Apple on Tumblr, indie labels had been pondering whether or not to license their music to the new Apple service,

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again because of the free trial period. Swift had effectively become the figurehead of growing disgruntlement among indie musicians and the cause attracted lots of attention among the media.

To be fair to Apple, it is not unusual for streaming services to refrain from making payouts for songs heard by an individual during a free trial period. Spotify does the same. The problem was primarily the length of time of the trial. According to industry analysts a three-month trial period – which is designed to hook people into the service – could be valued at as much as a stonking $4.4 billion.

Among those objecting was the British company Beggars Group. It said the trial meant record labels would be bearing an aspect of Apple's customer acquisition costs and it made its feeling known in a press release. "We are naturally very concerned, especially for artists releasing new albums in the next three months, that all streaming on the new service will be unremunerated until the end of September," it said.

That did not generate anywhere near the publicity that Swift did, though. Even the threat of withdrawing labels including 4AD, Rough Trade, XL Recordings, Young Turks and Matador (labels that count artists such as Radiohead and Vampire Weekend among their rosters) did not wake the giant sufficiently. So the disagreement rumbled on until (to paraphrase The Human League once more) Swift shook Apple up and turned it around, and turned it into someone new.

It was very a fitting move for the *Shake It Off* singer especially since Eddy Cue quickly tweeted: "We hear you @taylorswift13 and indie artists. Love, Apple." The backlash paid off and Apple announced it would be paying artists for free streams after all. "#AppleMusic will pay artist for streaming, even during customer's free trial period," he added.

Cue explained more in a phone conversation to Peter Kafka, a writer on <*re/code*>

Taylor Swift's Open Letter to Apple

To Apple, Love Taylor

I write this to explain why I'll be holding back my album, 1989, from the new streaming service, Apple Music. I feel this deserves an explanation because Apple has been and will continue to be one of my best partners in selling music and creating ways for me to connect with my fans. I respect the company and the truly ingenious minds that have created a legacy based on innovation and pushing the right boundaries.

I'm sure you are aware that Apple Music will be offering a free three month trial to anyone who signs up for the service. I'm not sure you know that Apple Music will not be paying writers, producers, or artists for those three months. I find it to be shocking, disappointing, and completely unlike this historically progressive and generous company.

This is not about me. Thankfully I am on my fifth album and can support myself, my band, crew, and entire management team by playing live shows. This is about the new artist or band that has just released their first single and will not be paid for its success. This is about the young songwriter who just got his or her first cut and thought that the royalties from that would get them out of debt. This is about the producer who works tirelessly to innovate and create, just like the innovators and creators at Apple are pioneering in their field… but will not get paid for a quarter of a year's worth of plays on his or her songs.

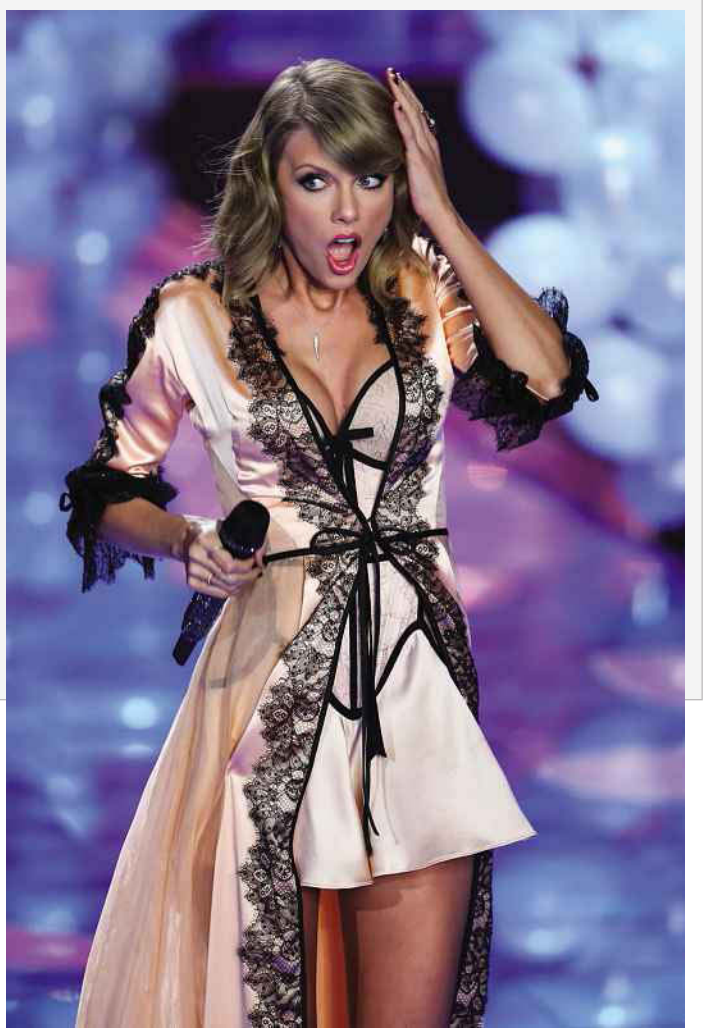
These are not the complaints of a spoiled, petulant child. These are the echoed sentiments of every artist, writer and producer in my social circles who are afraid to speak up publicly because we admire and respect Apple so much. We simply do not respect this particular call.

I realize that Apple is working towards a goal of paid streaming. I think that is beautiful progress. We know how astronomically successful Apple has been and we know that this incredible company has the money to pay artists, writers and producers for the 3 month trial period… even if it is free for the fans trying it out.

Three months is a long time to go unpaid, and it is unfair to ask anyone to work for nothing. I say this with love, reverence, and admiration for everything else Apple has done. I hope that soon I can join them in the progression towards a streaming model that seems fair to those who create this music. I think this could be the platform that gets it right.

But I say to Apple, with all due respect, it's not too late to change this policy and change the minds of those in the music industry who will be deeply and gravely affected by this. We don't ask you for free iPhones. Please don't ask us to provide you with our music for no compensation.

Taylor



➤ ***Taylor Swift was aghast at learning Apple Music would not be paying out royalties during its free trial period***

▲ *Apple Watch had lengthy delivery times which led to some cancellations*

(**tinyurl.com/qg3ates**). He said Apple would pay rights holders for the three months, although not at the same rate Apple would pay outside of the trial period. It would be on a per-stream basis rather than a percentage of revenue, he continued. And that, it transpired, was enough to get people back onside. As Kirk McElheran explained in a fantastic post on his *Kirkville* blog (**tinyurl.com/nzzjy2d**) Apple is paying between 1.5% to 3% more in overall royalties than other streaming services but, at the same time, it could have done without the negative publicity in the days leading up to the June 30 launch of Apple Music.

Watch Out

Apple must be getting accustomed to backlashes, though. The most recent physical product to amaze its way out of the doors of the Apple Campus at 1 Infinite Loop in Cupertino, California, has been the Apple Watch and, like Music, it provoked vitriol even before it was available for sale. *Forbes* contributor Ewan Spencer wrote a piece headlined 'Why I hope the Apple Watch fails', and it was facing a backlash over its battery life and a mandatory companion app.

An 18-hour battery life seemed decent enough when it was announced (just plug it in at night and let it power up while you sleep), but it came with a caveat of sorts: "dependent on usage". This pointed to the juice disappearing at a much faster rate: three hours if you're gassing on your watch like Michael Knight becoming over familiar with KITT. There were also many complaints that the iOS 8.2 update added a non-removable Apple Watch app. For a month, this acted merely as an advert and cluttered up the home screens.

Yet the biggest backlash came over the delivery times being quoted by people pre-ordering the Watch online on the day it became available. The 42mm Space Grey model had an extraordinarily long lead time even though, realistically, Apple should really have noticed that it would be the most popular. Customers snapping up an Apple Watch within minutes of it becoming available were informed of shipping estimates four to six weeks away. Twitter was awash with anger and it was a major failure on Apple's part.

Even those buying a higher-end, more expensive Watch were affected. The MD of a publishing company cancelled his order saying he hated waiting, did not feel valued as a customer and had suffered a lack of communication. His £8,500, he surmised, could be better spent. Others with less expensive orders even regretted their purchase when it arrived. "Ditching the Apple Watch for my G-Shock. Feels good to have a decent timepiece on my wrist again," said one. "Everyone I know with an Apple Watch is either selling or returning it," said another. Has #AppleHateGate begun polled *The Mirror* newspaper? A total of 68% said 'yes'.

No News...

But, read all about it. The problems have continued to mount. Between June 8th and 12th in San Francisco, Apple held its annual Worldwide Developers Conference and it took the opportunity to unveil iOS 9. One of the changes concerned Newsstand, the app which allows people to buy magazines and newspapers to

"You will just assume that I agree to your terms unless I opt out?"

Apple News

Publishers were angry when Apple sent an email presuming they would agreeing to the company using their RSS feeds in the News app. It came with the line: "If you do not want Apple to include your RSS feeds in News, reply NO to this email and we will remove your RSS feeds."

It also stated:

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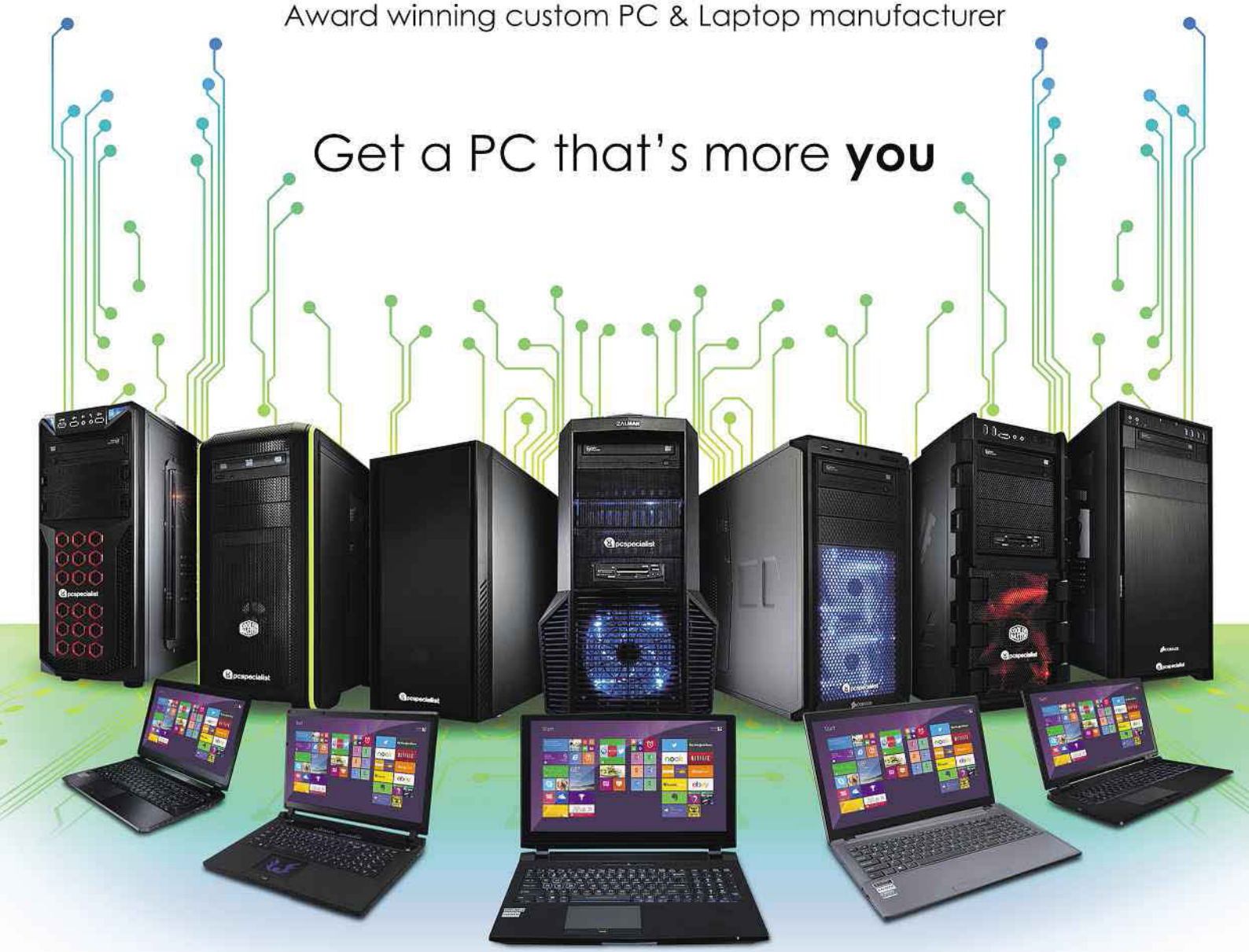

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read on their iPhone and iPad. It's a sort of virtual WHSmiths but it hasn't been entirely successful (even though it has cut the number of magazines some households collect in the course of a month, and so lessened a fair few rows).

Newsstand is being replaced by an app called News. It will aggregate stories from the most popular websites and newspapers and, like existing apps such as Flipboard, present them in a magazine-like format. Content will be pulled from the likes of *The New York Times* as well as publishers such as Hearst and Time Inc. Publishers are also being encouraged to sign up but herein has lurked a little problem.

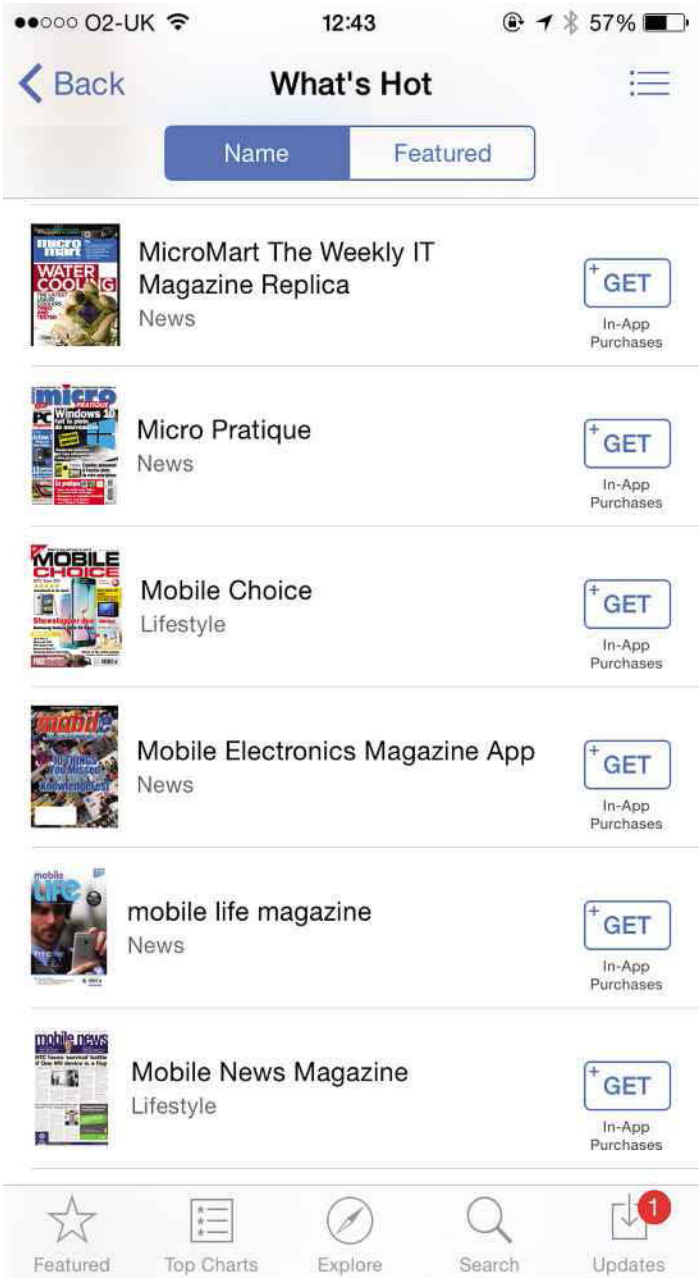
Apple sent an unsolicited mass email to publishers with a nice invite. It detailed the terms and conditions of the News app and service. On the face of it, it was nothing to worry about. It could have been seen as spam but all it needed was a tap of the delete button and the issue was nothing but a fleeting few seconds of time. Except anyone merely junking that email was making a mistake. Apple was presuming acceptance of the terms unless a publisher actively opted out.

Simply ignoring the email therefore meant that publishers were granting Apple permission to use their RSS content. That led to worry and concern that publishers were being bound to the agreement even if they had not seen it or had simply deleted it without paying much attention. And what made the matter even worse than that was the wording of the terms and conditions. It said: "If we receive a legal claim about your RSS content, we will tell you so that you can resolve the issue, including indemnifying Apple if Apple is included in the claim."

The idea that the publishers were being asked to stump up any potential legal fees that Apple may incur frightened a great many of them, especially given that a good number are small companies or individuals. But some also felt Apple was being very cheek, and more than a little presumptuous.

"Let me get this straight, Apple: you send me an e-mail outlining the terms under which you will redistribute my content, and you will just assume that I agree to your terms unless I opt out?" programmer Mike Ash wrote on his personal blog. There was also a backlash against Apple asking that publishers agree to place advertising next to or near their content without paying the content-provider any slice of the resulting revenues.

Apple is not the only company to suffer a backlash from those who deal with the written word. Amazon has also come under fire for its decision to pay independent authors based on the number of pages read, rather than the number of times their book has been borrowed. It related to authors who have enrolled on the Kindle Direct Publishing platform who have made their ebooks available via the Kindle Owners' Lending Library and Kindle Unlimited. Hari Kunzru, author of *The Impressionist*, tweeted that he felt it was like the "thin end of a wedge."



▲ ***Newsstand is being replaced by an RSS-led news app***

Making U-Turns

Whether or not Apple and Amazon decide to alter their plans is not yet known ("When you think you've changed your mind, you'd better change it back or we will both be sorry", perhaps, as The Human League would put it), But we can be sure that they will ride out their storms ("shake it off, shake it off" as Taylor Swift would say). That's because Apple sales are buoyant, and it's moving in the right direction: protecting falling iTunes revenues by entering the rapidly maturing streaming market to provide some genuine competition.

In March this year, Apple was expected to be valued at more than a trillion dollars, some three times as much as Google and more than the GDP of Indonesia, the Netherlands and Saudi Arabia according to World Bank Statistics. Chinese interest and the Apple Watch is helping immensely and, anger over the delivery times aside, the wrist gadget has actually sold well. The Watch has also been well-received overall despite the Twitter vitriol ("haters gonna hate, hate, hate, hate, hate" – yeah, another Swift reference).

With the Apple Music backlash, at the very least Apple has shown that is listening. It knows that music fans are passionate people and that they support the artists they like with the same kind of fanboy and fangirl devotion that techies often reserve for their favourites. To that end, it has had to take the backlash to heart, certainly more so than it needed to do with the negative

“Everyone I know with an Apple Watch is either selling or returning it”

reaction to Apple Maps following the iOS 6 rollout in 2013; or those bendgate issues with the iPhone 6 Plus (“with normal use a bend in iPhone is extremely rare,” Apple told the BBC last year).

Apple rode those backlashes out, but it has had to develop a thick skin since. Whenever Apple produces something, the weight of scrutiny virtually guarantees that someone somewhere is going to find an issue that will keep the PR people working overtime. Some of the issues will be largely frivolous (the backlash over the dropping of Adobe Flash support was eventually overcome by web designers rejigging their sites), while others will always be more newsworthy and serious (the allegations of child labour at Apple’s Chinese suppliers’ factories springs to mind). There has been plenty to keep Apple busy, from antennagate in 2010, gripping the iPhone 4 in a certain way caused too many dropped calls, to updates in 2014 that disabled services and TouchID security. Most, it has to be said, are here-today, gone-tomorrow issues.

It is near impossible for brands to be perfect and always act in the right way and since that’s never going to happen, it’s all about the speed of the remedy. In the case of the Apple Music furore, Apple appears to have taken Swift’s lyrics to heart (“I’m lightning on my feet”). In resolving the issue, the company is now able to “keep cruising.” For now it will, as Swift again sings, most likely be “Saying ‘It’s gonna be alright’.” Until the next backlash emerges, anyway. **mm**

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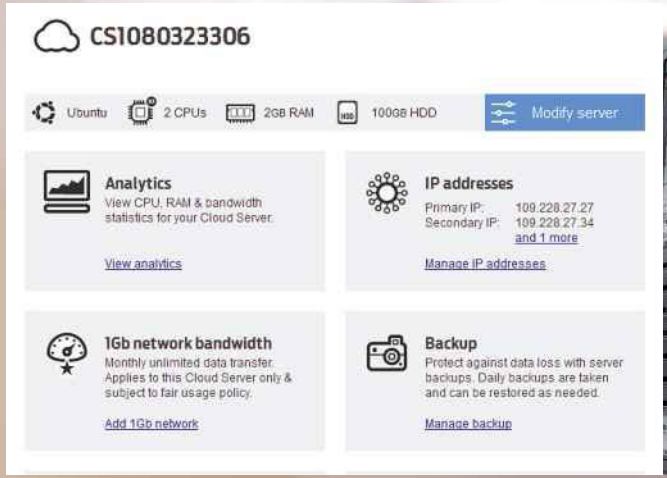

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How To Use A Tablet As A Second Screen For Your PC

We look at some options for extending your desktop to your mobile device

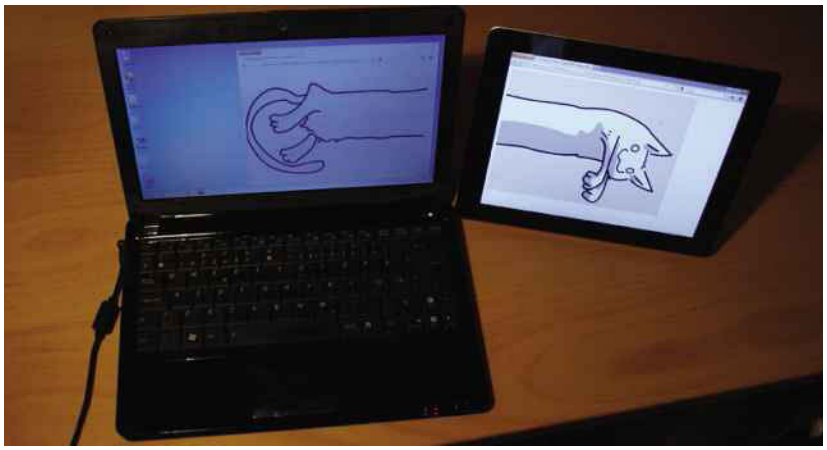
A dual monitor setup is quite a common sight these days, both at work or at home. We've used a dual monitor for some years and found the extra screen 'real-estate', as they call it, a great advantage when researching, transferring files and coping with multiple versions of a program open at the same time.

There is, however, a slight problem with having a dual monitor setup, and that's the amount of space taken up. While you can get away with a smaller computer desk when using a single monitor, once you include another one, your desk space decreases significantly.

The solution, of course, could be to get a bigger desk. But that requires more room, taking up space in your bedroom or whereever else it is you work and play. It soon becomes a bit of a bind, having a sizeable desk in your home. The same could be said at work as well. So what's the alternative?

As it happens, there are a number of apps available for both iOS and Android devices that will allow you to extend your PC's desktop to a tablet or phone. It makes perfect sense, when you stop to think about it. Most of us have a tablet lying around – sometimes one that's not even

Tweaking Splashtop makes the connection better, but you'll need to set up an account first



The result is a good, free second screen for your PC

being used. Most of the tablets we own are of a decent size too, at least 10 inches or slightly bigger, so they make for a good display. More to the point, the screens on the tablets are usually good quality too.

So grab a spare tablet, and join us as we look at how to extend and use a mobile device as a second (or, indeed, third) screen for your PC.

Paid Or Free?

There are a number of useful screen extension apps available for iOS, Android and Windows Phones. Some are free, but feature adverts or a limited connection time. Other are paid for apps and add a finer degree of control or extra features.

Which you decide to go for is up to you, but we've managed to include a selection of each with instructions on how to activate them as a second display and get them working under a Windows PC installation.

Let's start by looking at the Free apps.

Most of us have a tablet lying around – sometimes one that's not even being used

Splashtop

The first app we'll look at is the immensely popular Splashtop XDisplay.

The company behind Splashtop has been around for a while now and has in that time produced some handy resources. The one we're looking at here is Splashtop Personal, using the Splashtop Streamer to remotely connect to our Windows laptop from an Android tablet for use a second screen.

The process is easy enough. All you need to do is look over the Splashtop Personal site, at **goo.gl/De8ZME** and find the Streamer for the OS you're connecting to (in our case Windows).

Once downloaded, install the Streamer program on the PC and choose the 'Just Myself' option when asked. Incidentally, the other option, 'All Users', will allow the Streamer app to connect to the PC that the installation is on regardless of who's logged in and currently using it. It's a security issue, so for the time being we'll stick to the Just Me option.

After you click on the Finish button, the Splashtop Streamer will launch and offer you a number of options. The first thing to do is create a Splashtop account, by entering your email and a password, then clicking on the Create Account button.

You'll then receive an email detailing the other Splashtop products, for both PCs and mobile devices. However, instead of installing any of them, grab your Android tablet and search the Play store for Splashtop Extended Display HD.

When you've installed the app, start it up, and it'll inform you that you'll only have five minutes of connection time. It's a shame, but it's a good start to the experiment we're trying out here.

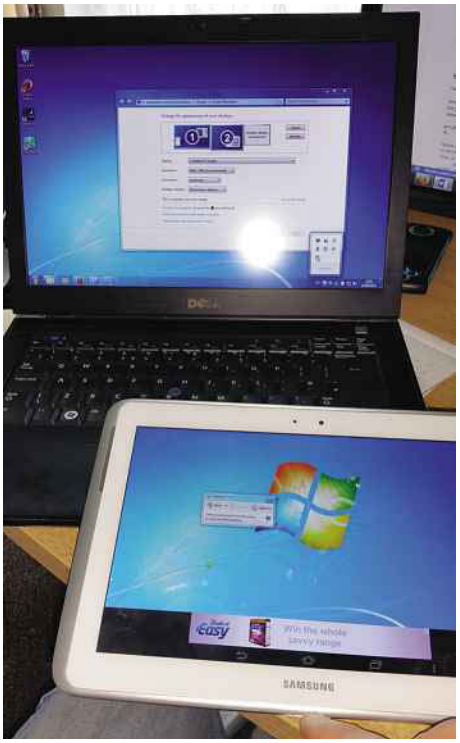
Now from the PC, click on the Security tab within Splashtop Streamer and enter a password. Once done, the Android app should display your discovered PC. All you need to do now is tap the PC, enter the security code and your tablet will become a second screen for your PC.

You may have to sort out the extended displays on the PC side, and depending on the graphics driver you have installed, that can either be extremely easy or an immense pain in the neck. Either way, you'll have five minutes of connection to the extended screen.

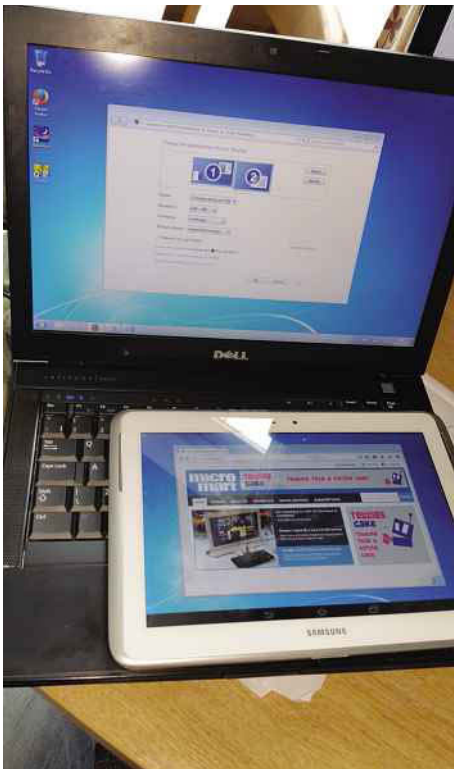
Air Duet Screen-Second Display

A slightly easier app this time around, but not one without its flaws.

The Air Duet Screen-Second Display app is used in conjunction with the AirScreen Server, a small program that can be found at **goo.gl/Twt4gs**. You'll need to install the server portion to your PC first and

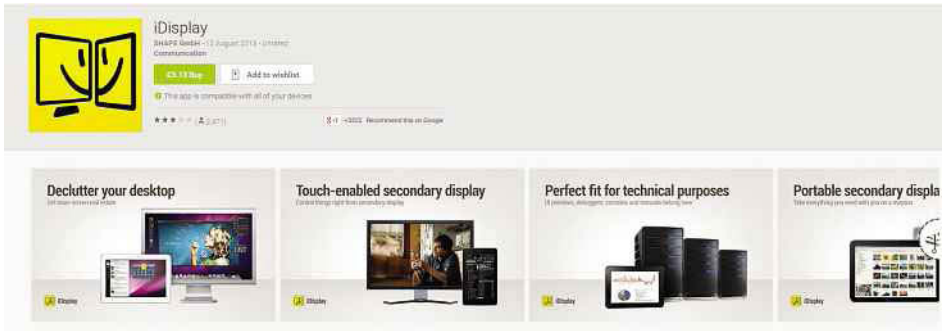


Air Duet works, but it has some flaws. The major one being the advertising



▲ *iDisplay is relatively cheap and works well*

▲ *Depending on what you're doing, the productivity gain is pretty good*



▲ *You'll need both the PC host program and the app for everything to work*

activate the TightVNC driver it uses to connect to the Android app.

Installing the PC software is easy, but it's not a very well translated or developed program. After the installation, the program asked us for our SSID, which seemed a little dodgy, but as far as we could tell there was no sign of anything untoward going on.

We didn't enter our SSID, by the way, because we were using an Ethernet connection, but once the server was installed, the Air Duet Screen-Second Display found the IP address of the laptop on our network, and with a single tap it connected.

The extended screen was instantly recognised by the PC, and we could move windows around and control the mouse with our finger as needed on the touchscreen. It's an extremely simple app and it works.

There are some flaws, though, as we mentioned. For one, the adverts along the bottom of the screen are very annoying, and you occasionally get blitzed by a ten second full screen ad for some random game.

As we said, though, it works, and it's a quick-fix solution.

Paid Apps

There are a few more free versions to consider, but in all honesty they're pretty dire. Some won't connect at all, while others open up a browser to some illegal site, ask to download something that looks immensely dodgy or contain so many adverts that using the tablet as a second screen is a nightmare.

Putting them aside, then, let's look at what you get if you're prepared to dip into your wallet. They don't cost much generally, but you do get a better connection and more features compared to the free version. Also, most of them don't have adverts, which is a benefit we can all appreciate.

iDisplay

iDisplay started out as an iOS app, hence the name. Now, though, it caters for both Windows and Android platforms, connecting them seamlessly.

iDisplay works in two parts, much like the free examples we just looked at. One part is the free iDisplay Desktop, available for Windows and Mac OS X. The other is the iDisplay app, for Android and iOS devices, which costs £3.13.

Start by downloading the free desktop program from **goo.gl/27R42s**. When installing, it'll set up the custom video driver, which came out as a unidentified publisher for our Windows 7 PC, but it's okay to choose the Install Anyway option.

After a system restart, you'll get a little iDisplay icon in your system tray, with which you can tweak the connection setting if needed – we left ours on Auto, and it worked perfectly fine.

The next step is to pay for and install the iDisplay mobile version. Once that's downloaded and installed, it'll automatically search for any iDisplay-running computers and display them in the main window.

All you need do is tap the PC with the program installed and it'll make the connection, asking you if you want to always allow a connection from the mobile device.

iDisplay is far superior to any of the free solutions we looked at. It's fast, there's no noticeable lag, no adverts, and it connects and sets up a 1280 x 960 display on the Note 10.1 tablet we're using. The only slowdown we had was when the network was being strangled by a large copy across two wi-fi machines, although you'll notice a far better connection when you connect the two devices together via a USB cable.

Within iDisplay, you're able to enable Windows sounds, autoconnect to the host whenever the app is started, display the current tablet battery status as a widget and alter the resolution for better speeds and access.

In short, it's everything you could ask for from a second screen.

Air Display 2

Air Display from Avatron Software is one of the more well-known second screen apps for connecting Android and Windows platforms. It's certainly good, although we'll go out on

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Air Display 2 was also a good, paid for app

a limb and say it's not as good as iDisplay. That said, it's worth giving the software a try.

Air Display works in the same way as all the other apps previously mentioned. There's the app itself, which costs £7.66, and there's the free Air Display host program for installation on your PC.

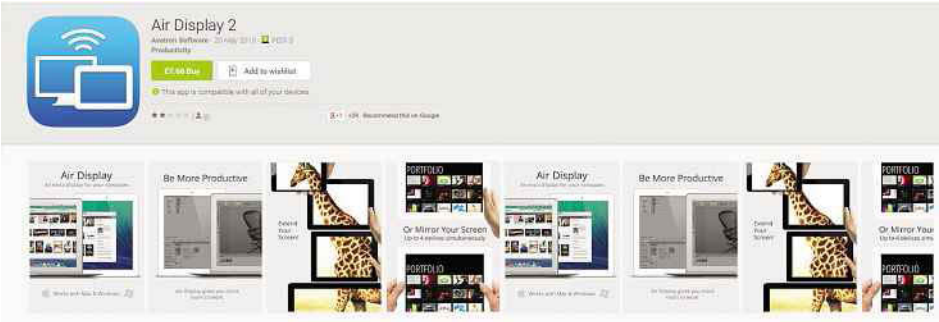
Start by downloading the PC host program, by heading to **goo.gl/iO6KuW**. You'll need to fill in a quick form first, detailing your email address, first name, last name and OS (Windows 7 or later, or Mac OS X 10.7 or later). Once complete, you'll be emailed the link to the download (or if you want, you can simply enter **downloads.avatron.com/AirDisplay_Setup.exe** into your address bar).

Setup for the host PC is simple. Once you've agreed to the licence, the installer will set up the program and prepare the connection and video driver. After a quick restart, there'll be an icon in the System Tray.

With Android or iOS, once the app has been paid for and installed, it'll automatically start to look for a connecting host PC. There are two ways you can connect and use the tablet as your second and extended screen. The first is by tapping the relevant host icon in the discovered window of the app, and the second is by clicking on the Connect button from the expanded icon in the System Tray on the host PC.

Either way will work, and both will auto pick up the other when the pairing software finds anything on the same network.

The connection is very similar to the previous iDisplay. There was barely any lag, and the second screen worked well, although in this version, the colours did seem



It's a bit more expensive though and probably not as good as iDisplay

a little muted, and there occasions where a window that was dragged over needed to be refreshed to be displayed correctly.

However, with a little tweaking, you can achieve a reasonable working second screen for your PC. We did have a couple of problems, though. The obvious negative point with Air Display 2 is the fact that it costs £7.66 – nearly twice as much as iDisplay. Both do a good job, and they're essentially using the same connection technology and will therefore operate in largely the same way.

The other problem with Air Display 2 is that it did make our Android tablet a little unstable after ten minutes or so of use. This could have been because we were moving all sorts of windows from one screen to the next and seeing how animation played. The overload could have sent the app into a twist and caused a problem, but we think it may have had something to do with the pretty weak wi-fi the Note 10.1 has.

More Paid For Apps

As with the free apps, there are a number of other paid-for apps. We could go into detail about these, but there seems little point, as they all use the same setup with a host PC program and a locally installed app, together with the same connection technology.

Bearing that in mind, we covered what we think are the best two paid solutions, just as we did for the free versions.

Conclusion

There are quite a few ways to connect your tablet and use it as a second screen for your PC. As we've seen, some of the options available are really very good and can be used effectively with your PC to aid productivity. Others, though, lack the bandwidth to be effective and are more of a novelty rather than something you would consider using as a full-time substitute for a 'real' second screen.

Speaking of which, depending on what you plan to use a second screen for, and from what we've experienced during this experiment, we think there's really no proper solution other than using a dedicated second monitor. The apps and their host programs are good, but in reality there are too many obstacles for them to replace a decent monitor – at least for the time being, anyway. **mm**

Honourable Mentions

If you're interested in looking into a few more second screen apps, then check out some of these:

SecondScreen: A free app that is more for mirroring rather than being used as an extension, but it can be tweaked to work as a true second screen. It's a little flaky, though, and tends to crash.

MaxiVista: An iOS-only app but one that's supposedly quite good. We haven't tried it, so you do so at your own risk.

Duet Display: Another iOS app, this is a little more expensive than MaxiVista. Again, though, we didn't try it.

Crazy Remote Pro: An Android app that works more like a remote desktop solution, but again it can be tweaked to allow second screen use. We did try this, and it while it worked for a brief time, it did fail and crash the tablet a couple of times.

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Computing Days Out

Mark Oakley needs a day off. Maybe he could spend some time at one of these lovely technology-tailored destinations

Centre for Computing History – Cambridge

Jason Fitzpatrick's enthusiasm for computing's past is infectious. Speaking to him over the phone for just a few minutes, he's already beguiled me with recollections of BBC Micro programming, Sensible Software and more classic consoles and systems than most can remember.

Jason, it's fair to say, strikes me as a bit of a computer geek. Takes one to know one, I guess.

As CEO of the Centre for Computing History, he has overseen the charity's relocation from Haverhill in Suffolk to its Cambridge home, where it's been opening its doors to the public since late 2013. In truth, without Jason's hard work and utter dedication to the cause, the centre wouldn't have got to where it is now. The centre's collection, formerly known as Jason's hoard, is in the tens of thousands, and as the collection grew, so did the need for a dedicated and bigger facility to show it all off.

The centre is made up of three main areas, plus a vast storage space housing the rest of the items not on display. In total, there are over 160 items for visitors to gaze at with envious eyes. Running educational workshops for youngsters, the centre is a huge hit with both schools from the local area and with nostalgic visitors such as you or me. The fact is that if you can't find something to tinker with here, you're really not going to find it anywhere.

Here are a few choice systems to whet the appetite. The centre plays host to the world's first online shopping system,

providing you with a window into how e-commerce came to pass. Then there's the Altair 8800, the world's first personal computer. Or how about the SGI Origin systems, sitting pretty alongside BBC Micros, classic consoles and Spectrums, Amstrads, Acorns… the list is endless.

Seriously, think of a computer system or console, and it's more than likely that the centre will have it. Best still, this is a hands-on experience. Even the few systems and items behind glass cases can usually be handled with care – you only have to ask. The fact is that visitors want to get up close and personal with everything that's on display at the centre, to make connections with systems they remember from their own youth, and marvel at the equipment that predated them.

For anyone reading this who pines for the good old days of computing – and I'm sure there are a fair few of you – the Centre for Computing History really is as good as it gets. If you're lucky, you might even bump into a genuine legend of the industry.

The centre puts on various events for visitors from time to time, from retro gaming nights to talks from industry insiders. The one that stands out for me is undoubtedly August's 'Bitmap Brothers Vs Sensible Software' talk, featuring none other than the founder of Sensible Software, Jon Hare, and Mike Montgomery, the man behind Bitmap Brothers. What a prospect! A chance to listen to these two greats of UK gaming discussing their careers and some of the games that they were instrumental in.

If you can't make it to one of the evening events, you should take some time to visit the centre this summer. Jason and his colleagues would be only to happy to see you. Indeed, I'll leave the last word to Jason on why you should visit.

"What we provide here is a very hands-on, highly enjoyable day out for all the family. Someone came up to me one day and told me that we have something very special here, as the whole family can get to grips with computers from our past. For the adults, it's a nostalgic look back at systems and devices from their youth – we all have so many memories of tinkering with these machines. For children, it's an opportunity to be challenged by computing and to discuss all this amazing technology with mum and dad, who can act as real-life historians for their children.

"I'm very proud of what we've achieved here."

Web address: www.computinghistory.org.uk.
Actual address: Centre for Computing History, Rene Court, Coldhams Road, Cambridge, CB1 3EW.
Opening hours: 10am to 5pm Wednesday to Sunday.
Look out for: The museum shop, where you can spend your pennies on some retro computing goodies.

The National Museum Of Computing - Bletchley

Firmly established as the UK's – nay, Europe's – largest collection of historic computers, The National Museum of Computing has steadily made a name for itself as a fantastic day out for computer geeks and families alike.

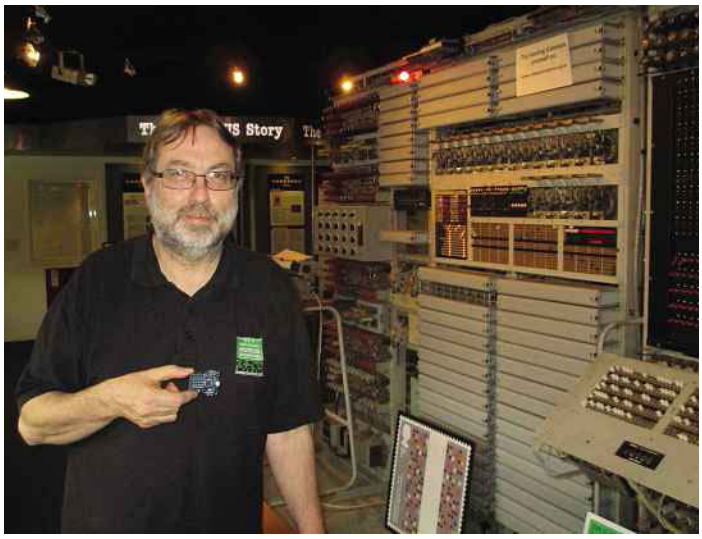
Famously housed at Bletchley Park's Block H, the museum's philosophy is spelled out in its mission statement: "To collect and restore computer systems, particularly those developed in Britain, and to enable people to explore that collection for inspiration, learning and enjoyment." It carries out its mission with real purpose, as the meticulous rebuild of the Colossus computer and the reboot of the Harwell Dekatron system prove.

> **"The National Museum of Computing has steadily made a name for itself as a fantastic day out"**

The dedication of all the volunteers that worked hard to bring these projects to life is a fine demonstration of just what we Brits can achieve when we put our collective minds to it. Indeed, the museum itself shines as a celebration of all things British, and you'll often bump into people connected with many of the machines on display.

Head of Learning Chris Monk remembers among the audience over Christmas were women who worked on Colossus in the war. "Others have come who wrote software for systems that we have on display here," he said. "Everyone has a tale to tell, and we try to connect the work we do here with as many people as we can."

A key part of the annual schedule now for the museum is its series of Bytes festivals that take place over spring, summer and the festive season. Next up is Summer Bytes, taking place from



▲ *Chris Monk with a BBC MicroBit alongside the Colossus Rebuild*

1st to 30th August, and things are shaping up for a fantastic day out for kids and grown-ups alike. "The idea behind Summer Bytes," Chris said, "is to give visitors a taste of a perspective on computing that they wouldn't expect to find in a museum. We give a broad view on things like 3D printing, Lego Mindstorms and get up close with the BBC Micro."

More and more families are coming to the Bytes events, which proves the increasingly broad appeal computing has for visitors. To have come to a point where computing rivals theme parks as a family day out is quite amazing – Chris told me that some families visited five or six times over the course of the Easter Bytes festival – but, of course, the museum isn't just for the kids.

"We provide a unique opportunity for visitors to get up close and personal with technology that has played a significant role in our history," Chris said. "The history of Bletchley Park itself is a wonderful ground in which to host all this amazing, British-engineered technology. As a location, we offer a unique perspective on how our most famous exhibits were put into action, and there's something really quite special about that."

Split over 13 galleries, visitors are encouraged to be hands-on with the exhibits, and on Saturdays visitors can meet and greet volunteers who are working on the machines themselves, offering a glimpse into what it's really like to operate these truly ground-breaking systems.

"The likes of Colossus and Harwell Dekatron are obviously big draws, but we have just as many people coming through the doors who want to go straight to our Spectrums," Chris said. "There really is something for everyone here, and key to the whole experience are our volunteers. We'll be running guided tours throughout Summer Bytes if visitors want to be led through the corridors and have any questions about any of our displays.

"We want people to see, feel and hear the technology we're so proud of."

Web address: www.tnmoc.org.
Actual address: The National Museum of Computing, Block H, Bletchley Park, Milton Keynes, MK3 6EB.
Opening hours: Thursday, Saturday and Sunday afternoons. (12pm-4pm in winter; 12pm-5pm in summer). Colossus and Tunny galleries are open daily. From 1st to 30th August the museum is fully open to the public daily, 12pm to 5pm.
Look out for: The PC gallery housing systems from Sinclair, Amstrad and the BBC Micro. So many memories.

The National Videogame Arcade - Nottingham

You'll have no doubt heard of Nottingham's annual GameCity festival, now in its tenth year, which celebrates all things videogame related, with a wide range of events, talks and presentations aimed at bringing gaming to a wider audience. As the festival grew, so it became apparent that there was also an opportunity for the organisation to build a permanent home for exhibits to reach a bigger audience, so the National Videogame Arcade (NVA) was officially opened in March this year. Since then, the visitors haven't stopped coming.

Set over three floors, not too far from Nottingham train station, the NVA is the kind of museum you always wished your parents took you to on a rainy weekend, rather than the actual museums they dragged you around, kicking and screaming. This "cathedral for videogames", as GameCity co-director Jonathan Smith describes it, is quite something. If you've seen any photos online, you'll see instantly that this is no stuffy space. Smart, modern, and bristling with videogaming goodness, it's hard to imagine that anyone visiting could fail to be charmed by its galleries.

> **"More and more families are coming to the Bytes events"**

What's particularly impressive about the NVA is that while it could have easily decided to focus solely on gaming's history (Nintendo, Sega, Sony et al), it's chosen to set its sights far beyond that. So while arcade machines such as *Ms Pac-Man* and *Track and Field* are in residence alongside Sega Mega Drives and Nintendo systems galore, it's the unique exhibits teaching about coding and game development that really catch the eye.

Take The Hall of Inputs, for example. Here is an interactive exhibit that shows how you can play games without a traditional controller by using an Arduino-enabled MaKey MaKey kit to turn a potato into a customised controller. *Donkey Kong Jungle Beat* (remember that?) is here too, alongside other forms of non-traditional inputs to showcase how gaming doesn't have to be all about joysticks and gamepads.

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Image courtesy of Anthony Hopwood

Image courtesy of Eve Bentley

Or there's the Jump exhibition, in which visitors are encouraged to leap around like nobody's business in order to control the game in front of them. The NVA is also the first space in the UK to show off interesting games such as *Room Racers*, an augmented-reality game played on the floor, which uses real-life objects as a race track.

The NVA is packed full of unique, genuinely forward-thinking exhibits like these, so it's much more than a nostalgia trip, although if that's your thing, then you'll be well catered for with the History of Videogames in 100 Objects exhibition. See the Magnavox Odyssey in all its glory, then have a play on a PS4.

Over the summer holidays, the NVA will be open every day apart from Mondays, so more visitors will have the chance to experience what's on display and take part in one of the many hands-on workshops that will be on offer.

The NVA is clearly trying to bring something fresh to the videogame industry and should be applauded for what it's set out to achieve. Jonathan is delighted at how things have gone. "We've had many return visitors already in our first few months of being open, and we're thrilled with the reaction we've had from visitors.

"It's a really interesting time for videogames, as we have a generation of people who grew up on gaming and they now have kids of their own. Those children are also completely engaged in interesting and unique gaming, with titles such *Minecraft* and consoles like the Nintendo DS providing new experiences for them to share. There's a mutual exchange of experiences in that respect, and I don't think that we've ever had a situation with two generations so engaged in gaming as they are now.

"We're delighted to be able to celebrate and be part of that."

Web address: gamecity.org.
Actual address: The National Videogame Arcade, 24-32 Carlton Street, Nottingham, NG1 1NN.
Opening hours: Friday, Saturday and Sunday (10am-6pm). Plus every day except Mondays over the summer holidays.
Look out for: The potato, of course!

Retro Computer Museum – Leicester

As a Midlands man, you'll forgive me for giving Leicester a nod here. In truth, the Retro Computer Museum would have warranted a mention regardless of any local links. Smaller than the other museums mentioned in the article, the museum is open on Sundays and is an appointment-only affair, but it's no less important for its hard work in preserving and displaying computer and console systems from the 1960s onwards.

What started off as chairman Andy Spencer's own personal collection – "it was something like 15 to 20 systems and a handful of games when it first began" – the museum is a treasure trove of computers, consoles and software from the ages. Now, the museum houses more than 400 unique systems and duplicates.

Aside from the 40 or so hands-on systems, the software available to play around with here is immense. Over 20,000 games from various platforms are on offer, and if a machine isn't out for visitors to play with, it can always be brought out on request.

Andy is keen to point out that donations are always welcome. "We've had systems come in to us from all around the world," he told me. "Several people have actually donated their entire collections, and if anyone has anything that they'd like to donate, they should get in touch. We collect literally anything related to retro gaming. Even if items are broken, they're sometimes great for spares."

> **"The NVA is packed full of unique, genuinely forward-thinking exhibits"**

And why does Andy think computer museums are currently so popular? "I think young people are increasingly engaging with technology, and that's helped to keep retro systems in vogue. We do a lot of school visits, and the most popular systems are still always either Pong or the ZX81."

Web address: www.retrocomputermuseum.co.uk.
Actual address: Retro Computer Museum, Unit S1, Troon Way Business Centre, Humberstone Lane, Leicester, LE4 9HA.
Opening hours: Sundays (11am-5pm by appointment only). The museum is also closed over much of the summer, due to attending events around the country.
Look out for: The fully working W-Industries VR Machine from the 1990s – go all Lawnmower Man for a day! **mm**

Top 5 Spam Emails

Which of these is clogging your inbox right now?

1 Lotto Winnings

It wasn't that long ago we didn't have a national lottery in the UK, but since its launch it's quickly become an everyday part of life. Not only that, but you can also win the lotto in other countries too – all without ever buying a ticket! Quite why anyone would believe their numbers have come up in a competition they never entered is a mystery, but clearly this scam must have worked at least a few times for spammers to bother sending out this nonsense.

2 Million Pound Money Transfers

Having tons of money is something most of us can only dream of. But in spite of our poverty, we're pretty certain that the wealthy of this world don't have trouble moving their cash around. Surely one of the benefits of being rich is that you have access to specialist banking services and accountants, who can help you shift your money to Swiss bank accounts and launder it through Premiership football clubs. Yet spammers and scammers would have you believe that instead of the million other more qualified people in the world, they chose you, purely at random, to assist them in getting money out a foreign country. Nothing dodgy about that at all...

3 Fake Medicine

For many people, the prospect of going to a doctor to discuss an embarrassing or personal health problem is just too mortifying. It's no wonder, then, that so much spam email relates to medicine sales, from Viagra to haemorrhoid cream. Of course, if any of these services do actually sell you a product instead of just taking your money and running away with it while laughing maniacally, then it's likely to be fake anyway. At best, you'll get a pack of breath mints, but at worst, you'll be taking a completely unknown chemical that could very well be dangerous to your health.

4 Fake Dating

Love is a wonderful thing, but it's not always easy to find. Yet in spite of that, it's unlikely that any lonely, single women are going to be sending out mass emails to random men to ask them on a date. Nevertheless, spammers are quite happy to use this ruse, so again it must have worked at least once for them to keep doing so. Maybe we're being too cynical, though? Perhaps 'minxycat28' from Russia really could be 'the one'. Just be prepared to share her time with about four million other people.

5 The Dream Job

Want to get paid loads of money for not really doing much at all? Of course you do. And now, thanks to the internet, you don't have to become an elected MP to make it happen. No, you can simply accept one of the many fantastic opportunities that drop into your inbox every week. Best of all, you don't need any actual qualifications. All you need to do is hand over all your personal information to a complete stranger. What could possibly go wrong?

Remembering... Manic Miner

David Hayward taken on the Amoebatrons this week

The first game I ever bought for my ZX Spectrum was *Gobble a Ghost*, which incidentally was a *Pac-Man* clone. The second, however, was a tad more known. It was *Manic Miner*.

Manic Miner is probably the one game that most people of a certain age will fondly recall when you mention the ZX Spectrum. It spawned a million clones, featured elements that most people thought were impossible on the machine at the time, and it was fiendishly addictive.

It's a funny thing, when introducing it to my kids a few years ago, how much the gameplay is as challenging now as it was back then. To my children's generation, the fact that there was no save or checkpoint function was quite unbelievable. 'How did you complete it?' they asked, and I was left to explain how we managed to squeeze in some frantic gaming to reach the next level in that gap between finishing our homework and waiting for dinner to be put on the table.

It was all about the sequences and timings. Once you mastered and knew how to get all the level keys without landing on the Poisonous Pansies, then you could whip through the earlier levels to reach the one you were currently stuck on.

It was immense fun and a game that has stood the passage of time remarkably well.

Its History

Manic Miner was the Spectrum's and probably the UK's first blockbuster game. The teenage Matthew Smith took just eight weeks from drawing simple screens on a notepad, through to actually duplicating tapes, creating Miner Willy and his 20 caverns of gaming torture.

He created the code on a Tandy TRS-80, according to legend, which apparently crashed every time someone put the kettle on, so he ended up working exclusively at night. *Manic Miner* was inspired by the older Atari game *Miner 2049er*, written by Bill Hoag, which had a miner leaping around levels, collecting treasure and avoiding everything else.

According to Smith, he created the first level to be a little more difficult than the leading levels. The reason for that was that he wanted the new player to be challenged and frustrated enough to come back for more, to pit their skills against the game.

Manic Miner made a considerable amount of money for Matthew Smith and, of course, there was a sequel, *Jet Set Willy*. The pressure was on, and the software companies, gamers, investors and everyone in between were hounding Smith to come up with the goods. Eventually he did, but to the detriment of his health.

It's a great shame, looking back at it now. Smith had a lot of money, he was young, and he never had the support he needed to cope with his fame. As a result, he strayed somewhat and ended up making some poor life choices. The result was a young man who was burnt out, and Smith vanished into gaming legend.

According to Smith himself, he lived in a commune in Holland repairing motorbikes in the mid-90s. Nevertheless, he is fondly remembered for creating the defining game of our childhood.

Did You Know?

- Smith wrote the code and level design on his TRS-80. He then created a circuit board that plugged into the expansion port on the Spectrum and downloaded the code to fill the Spectrum memory, which took a few seconds. Genius.
- Depending on who you talk to, 6031769 was either Smith's driving licence number or it was his mum's, his girlfriend's or his own telephone number.
- The original concept had waterfalls, more levels and more floating toilets.
- The third Miner title, *Miner Willy Meets the Taxman* (or Megatree) was never made, due to Smith's decline in health.

The Good

Cunning level design. Superb timing. Continuous music throughout the game and the number 6031769.

The Bad

That blasted Solar Power Generator level. I still can't get past that without having to use the cheat.

Conclusion

The game is as legendary as its creator, and for that we are eternally grateful. Matthew, if you ever read this, thanks.

How could you ever forget that opening?

The final level. How many of us actually got there without cheating?

Eugene's Lair, named after Eugene Evans no less

Component Watch

Looking for a new cooling option? We got five of 'em for ya...

As temperatures creep up, it's time to start looking for new ways to cool down your system – especially if you're running at a higher clock speed than normal. In this week's Component Watch, we're looking at a a fine selection of CPU coolers that should beat any standard OEM fan into the ground and ensure your processor stays nice and chilly all summer.

Deal 1: Nofan CR-80EH IcePipe
RRP: £42 / Deal Price: £37

If you want to try a completely silent CPU cooler, and have the space to fit it in your case, the Nofan CR-80EH heatsink might be the very one you need. Its strinking IcePipe technology uses 'capillary action' heatpipes with liquid inside to provide efficient, silent cooling at TDPs up to 80 watts (or 95 watts on the CR-95C model). Dust-free, lightweight and completely silent, this could well be the future of cooling if keeping the noise down is paramount. At this price, at the very least it has to be worth trying out.
Where to get it: Scan (**bit.ly/1BNbNbn**)

Deal 2: Akasa Venom Voodoo
RRP: £53 / Deal Price: £47

The Akasa Venom Voodoo is a 'Heatpipe Direct Touch' tower cooler with a pair of variable-speed 120mm fans and six heatpipes to move thermal energy away from the CPU, into the aluminium heatsink fins and away into the airflow of the case. Aesthetically speaking, it's got some of the most vivid colouring we've ever seen on a CPU cooler – but, though that may be important to some, many more will appreciate the fact that, despite having two fans, it's surprisingly quiet. You will need to be mindful of the unit's wide profile if you're in a particularly tight system, but otherwise it's a fantastic bargain even before the 10%-ish price drop being offered by the nice people at CCL.
Where to get it: CCL (**bit.ly/1Rxg4B8**)

Deal 3: Noctua NH-U14S
RRP: £72 / Deal Price: £48

Part of an award-winning line, Noctua's NH-U14S has full compatibility with all modern sockets, including tall-RAM LGA2011 models, with support for all future sockets guaranteed. This 14cm fan supports PWM modulation and has a low-noise adaptor so you can manage its sound output better than almost any other fan around. It even includes anti-vibration pads and clips in case you want to run two side-by-side for extra cooling – which at this price you can afford to!
Where to get it: CCL (**bit.ly/1SLrRyq**)

Deal 4: Corsair Hydro H55
RRP: £65 / Deal Price: £50

The Corsair Hydro H55 watercooling system is good for small cases and, like all closed-loop coolers, it's pre-filled and will never require refilling, so it's good for users who want water cooling without the hassle. In fact, it needs no more attention than a standard CPU fan does, and represents an inexpensive way to get into water-cooling!
Where to get it: PC World (**bit.ly/1GIMPs9**)

Deal 5: Fractal Design Kelvin T12 Hydro
RRP: £90 / Deal Price: £75

Though it's simple to install and near-silent, the Kelvin T12 has a high-performance ceramic pump, strong enough to cool multiple components in a single loop. Built from enthusiast-class hardware, the CPU block and radiator of pure copper for maximum performance and life span, with no maintenance required. It's expandable and the tubes are fastened with two-part brass fittings, providing a secure seal while being easy to open and re-seal with standard tools!
Where to get it: Ebuyer (**bit.ly/1aV4xwM**)

NEWS AND VIEWS

Europeans Won't Have Any Moments

Facebook drops app

Apple Steps Back

Royalty row over Apple Music service resolved

Following a very public row with none-other than pop princess Taylor Swift, Apple has reversed its royalties policy on the Apple Music service. Swift's issue revolved around the three-month free trial on offer to new sign-ups, and how during that time artists were not going to be paid for any music streamed by Apple.

Taylor Swift – if you haven't heard of her, type her name into Google and you'll quickly realise she's quite a big deal in music – was not the only vocal critic of the idea (quite a few independent record labels have been in a spat with Apple for some time on the matter), but she was certainly the highest profile star to voice the opinion that it was was unfair and that Apple should cover the costs.For it's part, Apple allowed exec Eddy Cueto announce that the issue has been resolved, tweeting "We hear you @taylorswift13 and indie artists. Love, Apple."

Things likely came to a head when Swift refused to put her latest, wildly successful, album *1989* onto the service, which would have left a seriously Spotify-pleasing void in its catalogue. Instead, Apple's blink sets something of a precedent for others to do the same. On hearing the news, Swift tweeted "I am elated and relieved. Thank you for your words of support today. They listened to us."

Less well-known, but no less vocal on the matter, was the UK's Beggars Group, which owns a bunch of labels. It also wrote an open letter to Apple stating that it was unhappy that rights owners and artists should be financially hampered by the trial. So, while Swift wasn't the only one concerned about this, but it does seem that it took a big name – which has hardly been harmed by this publicity – to help bring things to a resolution.

Facebook users in Europe will not be getting the photo-sharing app Moments due to worries over its facial recognition capabilities. The app, which groups photos according to the friends in them, was designed so users could better sync and organise photos but – while the app is live in the US – but there's a big problem for EU regulators as it lacks any opt-in mechanism. Without that in place, the app is currently blocked over here.

Facial recognition technology has become a bit of a concern for regulators worried over consumers' privacy, and this is a noteworthy warning to Facebook in how it uses it going forward.

As David Crookes tells us this week, Apple has attracted a fair bit of criticism in its time, and it's not always necessarily justified. That said, it's also made some terrible decisions in the past and, like any company, those mistakes should be scrutinised.

On the plus side for Apple, though, at least it's not being run by Stephen Elop, a man who seems to specialise in being paid loads of money for not being very good at his job.

The way he tanked Nokia and sold it to Microsoft, costing thousands of jobs in the process, is simply astounding.

So even in Apple's worst times (during which it's probably still making vast profits), things could always be worse.

Until next time,

Anthony

Editor

Cougar Case Roars Into Overclockers

Site lists mini-ITX case

UK suppliers Overclockers UK has listed the Cougar QBX compact gaming case to entice gamers lusting after more desk space.

This mini-ITX case stands out for a bunch of reasons, not least its compact dimensions, coming in it a mere 178 x 260 x 368mm in size. This should allow space-limited gamers the space for high-end components and displays to give the competitive edge everyone wants these days.

The Cougar QBX is also notable for its great cooling capabilities and expandability, with space for high-end graphics cards up to 350mm in length, up to five hard drives (HDD and SSD), a slim optical drive bay and a USB 3.0 interface.

Going back to the aforementioned cooling for a moment, this boasts the best for a case in this class, supporting up to seven fans and installing water cooling is also on the menu if that's your thing. The place on the web to head for on this one is **www.overclockers.co.uk**.

Meanwhile... On The Internet...

Wikileaks has been getting back on its game lately. While its searchable Sony database created many headlines, none of them were quite as inflammatory as those caused by its latest splurge of NSA-related content (**tinyurl.com/MMnet69a**), which seemed to indicate that US spies had been snooping on the last three presidents of France (**tinyurl.com/MMnet69b**). Sacré bleu, indeed!

Ever read a news story where it's like somebody's answered your prayers – then got angry about the fact that nobody got around to answering them sooner? To wit: Gmail's elevation of the Undo Send feature to a fully fledged setting option... Yes, it's really taken the best part of 20 years for this to become a thing – because, no, Microsoft's Exchange-only 'Recall and Replace' doesn't count (**tinyurl.com/MMnet69c**) – for six years of which it has been hidden away in Gmail's Labs section.

As of right now, though, users of Gmail users can activate the Undo Send feature in the General area of their Settings – a feature that appears to simply put a user-specified delay between hitting send and the mail leaving Google's servers (**tinyurl.com/MMnet69d**). We can now specify a period between five to 30 seconds within which to change our minds and pull back something we just sent – not long enough to deal with a sleep-ruining, ill-advised missive, but probably long enough to deal with clumsy Reply To All, wrong address or dodgy syntax mistakes.

If you're one of the more savvy Gmail users, you've probably had it activated for ages and also migrated to Google's new Inbox mobile app, which was rolled-out with the feature. Users of the Gmail app on mobile devices will, at least for now, have to migrate to Inbox in order to get the feature.

Regular readers will know we're big fans of John Oliver, the ex-Britisher Jon Stewart protege who is carving a notable niche for himself on HBO's schedule and YouTube, via his *Last Week Tonight* show (which UK viewers can find at godforesaken times on Sky Atlantic). While many of his missives are distinctly America-centric, he perhaps provided the go-to rant about the importance of net neutrality (though it focused on the skewed state of affairs 'over there': **tinyurl.com/MMnet69e**), sang with puppets about Prison (**tinyurl.com/MMnet69f**), offered couple of classic dissections of the problems within FIFA (**tinyurl.com/MMnet69g**), a great interview with Edward Snowden (**tinyurl.com/MMnet69h**) and has now come up with one of the most damning dissections of online misogyny you're ever likely to see on either side of the pond (**tinyurl.com/MMnet69j**).

It comes at a time when there is more focus on the way women are treated online than ever before and some appreciable progress with regards to some of the more unsavoury manifestations of that, such as revenge porn. This, however, brings home just how endemic abhorrent treatment is and how the line between 'IRL' and 'Online' has disappeared for the vast majority of us. Unfortunately, the video is unavailable for viewing in the UK at the moment, so we can't tell you how to view it. If you're clever enough to work such things out, then have at it.

After a decade or so of internet-fuelled viral hoaxes (**tinyurl.com/MMnet69k**), we are now, really and absolutely in the middle of the year which Marty McFly visited in *Back To The Future II*. The date, however, is not the only element of that film that's been an online obsession; while the whole 'two-ties' thing never really stuck in the public imagination, and we've yet to see Mr. Fusion or the Black&Decker Hydrator on store shelves, the clamour for a real hoverboard – such as the one Marty uses to escape from Griff Tannen and his gang – has only increased over time, it would seem.

Collectively, we've fallen for hoaxes (**tinyurl.com/MMnet69l**) and lusted after the real thing, in the form of the Hendo hoverboard (**tinyurl.com/MMnet69m**), only to be disappointed to find out that it wouldn't work away from its magnetic surface. We've waited and hoped...

Which, we suppose, is the underlying factor in the success of Lexus' viral campaign for an as-yet-unspecified new car – a campaign dubbed 'Amazing Motion', which has featured a Lexus-branded, very real hoverboard called SLIDE (**tinyurl.com/MMnet69n**). It's attracted millions of viewers, and loads of analytic attention in the press (**tinyurl.com/MMnet69o**), but it is – sigh – yet another clever tease. While the deck appears to float over concrete, we're assured that the magnets that allow it to levitate will (as was the case with the Hondo, explained at **tinyurl.com/MMnet69p**) only perform above a surface with magnetic properties. The mist seen emanating from the board in the video, however, is not for effect. It's from the liquid nitrogen that's being used to cool the superconductors essential to the whole thing's slightly different way of performing the trick – apparently called the Meisner effect. (**tinyurl.com/MMnet69q**).

Close, but no cigar, then...

.AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

Three things that currently seem to fuel YouTube are cat videos, reaction videos and GoPro footage of people doing exciting things that'll impress their mates and/or make them jealous. Therefore, it's no wonder this footage of a glider pilot reacting to a cat stowaway hiding in his wing has racked up 14 million hits as we sit and write this (**tinyurl.com/MMnet69r**). Internet gold, we tells ya...

QUICK BITS... Nokia will begin making phones again next year when its licence agreement with Microsoft ends

Caption Competition

What's this fella up to? Whatever is is, it's probably NSFW, so here are some of the more family friendly captions we received. All others will be judged secretly in our heads.

- Dwynnehugh: "20 years ago that would have made my hair curl!"
- doctoryorkie: "Left handed laptops – something about them just isn't right."
- doctoryorkie: "iwatch prices announced."
- BullStuff: "No, I was straightening my tie with my other hand!"
- Thomas Turnbull: "Wow this internet connection is so slow I've just received a message that the Titanic has just sunk."
- Thomas Turnbull: "I've just won £60,000,000 on the Spanish Lottery and I didn't even buy a ticket."
- Martin Best: "Tommy was shocked by the latest image used for the Micro Mart caption competition."
- Robert Wheelhouse: "This just in: Man overreacts to Facebook friend request not being accepted."
- Edward Winslet: "Webcam dentistry."
- John Harris: "The first person to follow Katie Hopkins' Twitter account."

Thanks to everyone who entered, and well done to Rick Welles, who came up with "So that's what the Any key does!" An oldie, but a classic.

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) and say something funny (but not too rude) about the picture below or email us via **caption@micromart.co.uk**.

Broadband Switch Made Easier

Ofcom rules now in place

The days of ringing, waiting and chasing ISPs are over as new Ofcom rules surrounding switching broadband providers have been introduced.

The new rules, which will affect around 80% of broadband customers – but not Virgin Media – mean that anyone looking to switch their broadband and landline connections will have the strain taken out of the process under an easier one-touch system, in which the responsibility lays in the hands of the provider you're wanting to switch to.

Basically, there's now absolutely no excuse not to switch if you're unhappy with your current provider. Get it done!

5G Could Be Here In Five Years

Agreement on development goals and timeline

The International Telecommunication Union (ITU) has met up to discuss the future of 5G and it all sounds very promising. Having drawn up a roadmap on timelines, goals and processes surrounding the development of 5G for mobile devices, the ITU has suggested that it could be up and running come 2020 (which is, scarily, not all that far in the future).

The ITU is keen on 5G for communications future, noting it's an important step for mobile communications as it would help to create a smart, networked communications environment. It should certainly mean uber-fast speeds and greater connectivity while on the move, most likely helping to create smart cities.

Snippets!

Two Thirds Of Web App Attacks Via SQL

The latest 2015 Global Threat Intelligence Report is out and it transpires that around 60% of all web application attacks in the UK are SQL injection attacks. The report looked at over six billion security attacks last year and injection attacks are also twice as likely to happen in the UK as anywhere else in the world. The report also detailed that only 46% of new malware is detected by anti-virus software.

Did You Unplug?

National Unplugging Day was on 28 June, calling on families to unplug gadgets, TVs and mobile devices for 24 hours.

Children's charity Dreams Come True supported the MyFamilyClub campaign to help raise money while also raising awareness of a nation plugged into technology.

If you don't think this is a problem, here's a stat for you. A survey from the charity found that 31% of respondents were less likely to give up mobile devices than their toothbrush, soap or sleep.

Record The Sea

Now this is a nice little project: the National Trust and the British Library are putting together an audio archive of 'Sounds of our Shores' from around the UK seaside and they want all of us to record moments from our coastal days out.

The idea behind the project is to put together a record of our coast for future generations and we have to say we really rather like this idea, especially as The Human League's Martyn Ware will put together a new piece of music based on some of those sounds next year.

The project website is at **www.bl.uk/sounds-of-our-shores**, if you'd like more information.

Microsoft Confuses over Free Upgrades

Blogs, blogs and blogs again

Who knew that a simple blog post would lead to such confusion. It took three blog updates for Microsoft to confirm, then deny, then clarify exactly who would qualify for a free upgrade to Windows 10. Let's try to get this right.

The blog post first wrote that users who installed the Insider Preview of Windows 10 on their PC would be eligible for a free full download of the OS upon its release in July.

Suggesting that this was available for all users – not just Windows 7 and 8 ones – the Internet became busy with chatter about this offer. Then Microsoft updated the blog post, clarifying that "It's important to note that only people running Genuine Windows 7 or Windows 8.1 can upgrade to Windows 10 as part of the free upgrade offer."

Since then, a third update has, hopefully, cleared everything up, stating that Windows Insider users sticking with the program, plus Windows 7 and 8 users, will be eligible for a free upgrade. Sorted, we think?

FreePC From MODECOM

Intel-powered USB drive

Entering the growing tiny PC arena is this USB drive-sized model from MODECOM. Dubbed the Free PC, it promises all the power and grunt of a normal-size PC in a device that can be carried in your back pocket. Kitted out with a quad-core Intel Atom Bay Trail CR Z3735F processor, 2GB RAM and integrated HD graphics, this runs off Microsoft Windows 8.1. Pitched at home users and commuters, the price is set at £130.

As the drive can be plugged into an available HDMI connection on any TV or monitor, you can set this up anywhere and within seconds have access to 16GB of storage – and internal capacity can be boosted further still via the built-in microSD card reader, with support for up to a 32GB micro SDHC card.

Tying things up nicely, Bluetooth 4.0, cloud storage via OneDrive and a free month trial of Office 365 Personal point complete the main features.

Find it online from July.

QUICK BITS... **A 1TB version of Sony's PlayStation 4 console will come to market in July**

BBC Develops Mind Control Device

Scary stuff

Not content with producing and airing *Doctor Who*, the BBC has now developed a prototype for technology that wouldn't be seen out of place on the show.

The 'mind control TV' allows users to select a show to watch on an experimental version of iPlayer just by thinking about it. While that could be tricky if you happen to have a really poor attention span, the technology – that utilises an electroencephalography brainwave reading headset (that's not easy to write, never mind say) with sensors that measure electrical activity in the brain – is pretty exciting. Though, it's worth reminding ourselves again that it is just a prototype at this stage.

The device itself, the MINDRDR TV, comes courtesy of the BBC's collaboration with digital agency This Place and it uses Chromecast to wirelessly connect. As for the trial itself, you can see a video clip of this in action at the BBC Internet blog but, in short, it did indeed work to some degree.

Blade Builds Land At Overclockers

Nine high-performance rigs on the table

Another new announcement from Overclockers now and this one surrounds its launch of the Blade range of gaming systems. The nine high-performance systems make up its main gaming range starting from £420 and they are assembled, configured, overclocked and tested by a bunch of experienced system builders before finding their way to you.

Fully Windows 10 ready and packed with high-end hardware, options for adding secondary hard drives, SSDs, graphics cards and more, these are pitched as a great out-of-the-box solution. You should pay a visit **www.overclockers.co.uk** if you're interested.

Heinz Means... Porn?

QR code directs to dodgy site

A bottle of tomato ketchup is at the centre of our next story, specifically one with a QR code that led a consumer to a porn site.

Germany's Daniel Korell spotted the dodgy link on a Heinz bottle, then reported the matter to the company. The code was actually supposed to direct consumers to a website where they could design their own label for Heinz Tomato Ketchupm, but it transpires that the registration of the URL had expired and had since been bought by a porn website.

The BBC quoted Korell as saying: "I found it rather funny and thought it was worth [sharing] on Heinz's Facebook page." Heinz wasn't amused and sent him a free bottle to say thanks for the heads-up.

This could have all ended in an entirely different, uglier way for Heinz, so fair play to Korell for being a good sport.

Which? Slams Services Providers

Broadband speeds still failing on speeds

We long for the day that we no longer have to report on this ongoing and increasingly frustrating issue. *Which?* has released another UK broadband report that once again notes British ISPs are failing to deliver the 'up to' speeds advertised.

Worst among the offenders were BT and Plusnet with just 1% – yes, 1% – of customers receiving the advertised 76Mbps speed on those respective packages. Conversely, Virgin Media customers are faring well as 98% of its cable customers attaining the advertised speeds.

Taking a broader look at the market, just 17% of fixed-line broadband users get the advertised 'up to' download speed and the maximum speed, on average, received by UK households was just 68% of advertised speeds.Pull your collective finger out, chaps.

Brother DCP-J4120DW

Michael checks out a new Brother all-in-one

DETAILS
- **Price: £143**
- **Manufacturer: Brother**
- **Website: www.brother.co.uk**
- **Required spec: Computers running Windows XP and later or Mac OS X 10.7.5 and later**

Adding to its extensive range of inkjet printers, Brother has released the DCP-J4120DW model; the letters 'DW' indicate that this product offers duplex printing and wi-fi connectivity. The J4120 also adds A3 printing to the basic A4 print, scan and copy facilities plus mobile print and scan options via the iPrint&Scan app.

The printer is a four inkjet cartridge model with the cartridges (black, cyan, yellow and magenta) slotting into a compartment at the right front corner of the printer element. Once the cartridges have been inserted the printer automatically runs. In order to facilitate the A3 print option within an A4 printer design, Brother has made some fundamental changes to the paper feed within this model. A4 and smaller sizes of paper are fed from a 150-sheet capacity paper tray at the front of the unit while A3 paper requires manual feeding through a concealed slot at the rear of the printer. Whereas most paper sizes are inserted into a printer in portrait orientation, A4 paper is fed and is ejected from the printer in landscape orientation. The resulting document will have been converted into portrait orientation specified, though.

Taking up the space between the scanner and printer is a control panel. Adjustable to various angles for ease of viewing, the panel features a 6.8cm colour touchscreen along with buttons for back, home and cancel plus power on/off. When the J4120 goes into automatic sleep mode, the home button pulses slowly to indicate it is waiting for the next task whether it involves print, scan, copy or photo jobs.

To the left of the panel is a concealed compartment. Here you will find a USB port and memory card slot for devices containing content, such as photos, for printing. Support is provided for SD, Memory Stick and MMC formats.

The Brother driver has three levels of quality: Fast, Normal and Best. Printing monochrome and colour documents using these three levels produced the timings listed in the table below. Using the duplex option, a 10-page document was printed on five pages in 90 seconds. While this quality of output would be best reserved for internal use, either Normal or Best would be fine for documents meant for distribution. Printing photo images revealed that the J4120 operates faster in landscape than portrait orientation. 10 x 15cm and 13 x 18cm prints, produced in portrait mode, were delivered in 3:59 and 4:29 respectively. An A4 image took 2:44 to be printed in landscape mode.

The CIS scanner delivers a resolution of 1200 x 2400dpi optical or 19200 x 19200 interpolated. TWAIN and WIA compliant, the scanner can direct output to various locations such as email and selected Cloud based services.

Replacement inkjet cartridges are available in standard and high yield versions. Standard black (550 pages) is available for £11.50 while standard colours (550 pages) cost £7.40 each. High yield cartridges are priced at £16 for black and £10.22 for each colour with an estimated 1200 pages.

It's worthy of note that I have seen this printer listed at around half the recommended price, which makes it a much more attractive prosepect in terms of value for money.

mm Michael Fereday

A good general purpose all-in-one especially following a web search

Brother DCP-J4120DW		
	Monochrome	Colour
Fast	24ppm	23ppm
Normal	16ppm	9ppm
Best	4ppm	2ppm

MSI R7 370 Gaming 2G Graphics Card

Gaming on a budget these days looks pretty good

DETAILS
- Price: £119
- Manufacturer: MSI
- Website: goo.gl/NbdnGr
- Required spec: Spare PCIe x16 3.0 slot for best results. Windows 7+ for software

There's plenty the modest gamer can enjoy from the R7 370

Earlier in June, AMD launched its new 300-series of Radeon cards and MSI has been quick to move in with the launch of the R9 390X Gaming 8G, R9 380 Gaming 2G and the card we're looking at today, the R7 370 Gaming 2G. The R7 370's GPU first appeared as the driving force behind the Radeon HD 7850, which was a pretty decent budget gaming card some years ago. The GPU was then resurrected for the R7 270 sometime later and is now once more resurfacing with a new lease of life in the R7 370.

The Pitcairn GPU isn't going to set the world alight with it sheer power, but it's a decent enough processor to enjoy most modern gaming titles. With a core base clock of 1000MHz and core boost to 1050MHz there's a reasonable amount of grunt in the old GPU to keep up with you. The 2GB of GDDR5 memory, with a memory clock frequency of 1425MHz is good too, as are the 1024 Shaders, 64 Texture Units and 182GB/s memory bandwidth. It's the baby of the new 300-series, but good for gaming on a budget thanks to the £119 asking price.

As with most MSI products the attention to detail and manufacturing processes, as well as the components used are of very high quality. For example, the Twin Frozr V fans that cover the large heatsink and three 6mm heat pipes; it may seem a little like overkill on a GPU that never really heated up all that much in the past, but it does offer a higher degree of overclocking and peace of mind for those who want to tweak the card.

To that end, the new Gaming App for the 300-series allows the user to fine-tune the card to their own tastes. The three pre-set modes allow for silent running, a gaming mode for the best balance between performance and heat, and an overclock mode that boosts the GPU and increases the RPMs on the fans. Within the app you'll also be able to control the LED effects and colours, as well as a few other tweaks here and there for balancing blue light and gamma adjustment for movies.

Connectivity for the R7 370 includes HDMI, DisplayPort, DVI-I and DVI-D ports. It's a CrossFire capable card and you'll also find a single six-pin power plug at the end of the board. On the whole then, a simple enough setup.

The emphasis, though, is clearly budget gaming. As we already said, the R7 370 will be able to play a wealth of current games on medium to high settings well enough – and depending on how demanding the game is you might be able to get away with the odd instance of ultra-settings. Don't expect it to perform as well as its siblings though. Having said that, when we tested it with an Intel i7-4790K at 4GHz, 8GB RAM and Windows 8.1 it managed to score a respectable 8702. Which is enough to run the likes of *GTA V* on maximum settings at 1080p at an average of around 50FPS.

Although the MSI R7 370 Gaming 2G may appear at the bottom of most recent benchmark graphs that doesn't mean it couldn't be a wise choice of gaming card for a certain type of user. As we said, those on a budget will certainly appreciate its worth and those who dally with light gaming won't be too fussed by big benchmark numbers.

In short then, a good, reasonably priced, entry level graphics card. With that MSI extra-quality touch added for good measure.

mm David Hayward

An entry level gaming card, but a well balanced one for light gamers

HP Spectre x360 Convertible Laptop

HP strives to make the Spectre x360 the best hybrid laptop/tablet so far

DETAILS

- **Price: £899**
- **Manufacturer: HP**
- **Website: store.hp.com**
- **Model No.: 13-4009na**

Ever since Microsoft launched Windows 8, PC makers have been trying to adapt to the seismic shift it threatened to cause in the mobile PC marketplace. Some put touchscreens on ordinary laptops, others devised detachable keyboards, and a few went the reversible hinge concept of a laptop/tablet hybrid.

The HP Spectre x360 falls into the latter category, as this unapologetically Ultrabook-inspired design – and what an utterly glorious piece of engineering it is. So good, in fact, that is serves to remind us all that it isn't just Apple that can make beautiful things packed with excellent functionality.

First contact conveyed to me that the outer skin of the Spectre is entirely aluminium, a surface that's pleasing to touch and easy handle in its various hinge positions. Launching pre-installed Windows 8.1 reveals the Spectre's second big selling point: its stunning 13.3" 1080p diagonal Radiance FHD LED-backlit touch screen. For its size, this panel is probably the best I've seen. The clarity and viewing angles of the interface could hardly be better; though those desiring a thinner border will need to accept that, as Windows 8 uses edge swipes, some framing is required.

Computing power in the review model comes from the new Broadwell Intel Core i5-5200U 2.2GHz, accompanied by 8GB of DDR3 memory and a 250GB SSD. While it's not a huge leap ahead of previous, Haswell-based, processors there is plenty of power for typical office tasks, and the HD 5500 GPU can even turn its hand to 3D games, if you're willing to sacrifice quality settings.

HP also managed to construct an effective keyboard for the Spectre, often a weakness in Ultrabooks. This is big enough, and has sufficiently tactile travel, to enable reasonable typing speed. The only issue I noticed was that the function key line has been replaced with a less helpful media selection along the top edge.

The touchpad is large and works even with the lightest of contacts. I've seen a few owners complain on HP's website about issues with a sticky pointer on it, but I didn't experience anything similar.

EDITOR'S CHOICE micro mart

Working through the rest of the specification is really a tick-box exercise. Ticks for HD webcam, ac class wi-fi, three USB 3.0 ports, HDMI and DisplayPort outputs, SD card slot, backlit keyboard, Accelerometer, Gyroscope and eCompass. There's no fingerprint reader, if that's an issue for you – but that's about all that's missing.

Of all the features, though, the one that is the deal clincher for me is the three-cell, 56 Wh li-ion polymer battery. That, when combined with the 14nm fabrication on the i5-5200U, delivers stunning battery life (the likes of which previously only MacBook Air owners could usually experience). HP (albeit optimistically) suggests it's good

for 12.5 hours use – I couldn't match that, but I got 11 hours out of the Spectre x360 while using if for light tasks.

Given so many positive points, I'm almost embarrassed to find fault, but there are some places that the Spectre could probably be better. At 1.48kg it isn't that lightweight, though it's something you only really notice using it as a tablet. The biggest bugbear, though, is – as usual – pre-installed apps. HP just couldn't resist junking it up with all manner of tools, Booking.com, Skype, Netflix and the software abomination otherwise known as McAfee LiveSafe. It's like someone buying a classic Ferrari or Aston Martin, and then immediately hanging furry dice from the rear view mirror. It's hugely disrespectful to your paying customers, and I wish HP would get the message and stop because, frustratingly, if you spend the time to de-gunk the machine, this is a really top notch laptop that knocks many others into a cocked hat.

I'm actually a little shocked at the price because – considering the case, screen and battery life – I'd convinced myself that this machine was going be more than a £1,000 at very least. That it doesn't cost more probably says as much about the state of the PC industry as it does about HP's ability to make systems to tight margins.

The review model HP provided was the entry level 13-4009na; if you want 500GB SSD storage and a marginally more powerful CPU (i7-5500U) it offers the 13-4007na for another £200. Those looking for bargain should check out 'the very worst possible store for technical help' (you know the one), as it's selling the basic model for £100 less.

> **"HP didn't manage to kibosh this device's usefulness as a laptop"**

The best aspect of this design isn't a specific feature at all, though. It's that, in delivering a hybrid design, HP didn't manage to kibosh this device's usefulness as a laptop. If I owned this I can't imagine myself using it as a tablet very much, but I could make great use of it in it's more conventional configuration. The Spectre x360 is a marvellous laptop; it's also a tablet, if you really must use it that way.

mm **Mark Pickavance**

Superbly built and specified Ultrabook and tablet hybrid

micro mart
9 Quality
8 Value
9 Overall

Intel NUC NUC5i5RYK Intel Core i5-5250U Barebones

Intel leverages its latest chip technology into a miniature PC

DETAILS

- **Price: £296.36 (Ebuyer)**
- **Manufacturer: Intel**
- **Website: www.intel.com/NUC**
- **Required spec: Monitor, mouse, keyboard and wired/ wireless network**

Having tested some other small form factor systems recently, I'm still rather shocked by just how small Intel NUC (or Next Unit of Computing) actually is. Developed under Maple Canyon codename, the NUC comes in two form factors both with the same 10cm square footprint, but just 32.7mm or 48.7mm high.

The NUC5i5RYK review model was the smaller of these two, and is probably the smallest true PC that this writer has reviewed up to this point. What's critical about the NUC design is that it takes Intel's 14nm crafted 5th Gen ULV (ultra-low voltage) Broadwell processor technology and welds it to the Broadwell-U chipset and potentially GT3e 'Iris Pro' level graphics.

This technology was built for premium Ultrabooks, but it seems equally at home shoehorned into a beautifully crafted aluminium box that operates, to all intents and purposes a mid-range desktop PC. The CPU on the review hardware utilised a Core i5-5250U (1.6GHz up to 2.7GHz Turbo) that's both dual-core and hyperthreading – though, Intel will also be releasing cheaper Core i3 GT2 Graphics versions, along with high-end Core i7 series machines for those with splashing cash at hand.

As the NUC couldn't fit a full size memory module in any direction, it isn't a surprise to see that it uses SODIMM laptop tech. This, however, allows it to provide the sufficient room for two modules, and thus allow 16GB of DDR3L RAM. There's also a single M-Keyed M.2 SATA/PCI-E slot for main SSD storage (22x42, 22x60 or 22x80) – though internal drive space is the main compromise of the 32.7mm high enclosure.

> **"I'm still shocked by just how small Intel's NUC (or Next Unit of Computing) is"**

While the larger enclosures can take a 2.5" 9.5mm drive, while those with the smaller box aren't entirely scuppered for using a bigger physical drive, however. Intel designed the NUC to be uniquely customisable so, while the sides are solid aluminium, the top is actually a plastic lid, and thus built to be removable. Intel's intention is to allow third parties to build their own custom lids – an intention enhanced by its decision to add an extra SATA port and USB header on the motherboard. It also appears that it will also be selling the motherboards for those who want to use cases that are a totally different shape and layout to the stock NUC design. Given how Intel has been in the past about standards it controls, this all seems remarkably cooperative, and – frankly – a little out of character, if we're being honest about it.

Back to the NUC, though, and what a lovely piece of kit it is: the review components Intel provided included both a

320GB Intel SATA based SSD and a higher performance 256GB Samsung XP941 PCI-Express x4 module. The difference in speed between these two options was quite striking, given they use the same M-Keyed slot. Under Window 8.x the Intel SATA module was rated at 420MB/s reading and 292MB/s writing. In comparison, the PCI-E module cranked out a quite staggering 1099MB/s reading and 864.7MB/s writing. For those who like immediacy, the answer is plainly M.2 PCI-E option. Though the SATA-based drive can hardly be described as a slouch.

The new HD 6000 video platform is also a modest boost, featuring 48 execution units and turbo boosting to 950MHz. On paper it's twice what the old HD 5300 could offer, though it's still not going to impress gamers. What it does do is deliver Intel's support for 4K displays, finally. This will please some, no doubt. The main thrust of this design, though, is to do 10% more than the previous Haswell CPU and GPU combination while operating within 15 watts maximum power envelope. Both of which it acheives.

As barebones PCs go, it isn't cheap enough to be an impulse buy – especially when you consider that the quoted price doesn't include any M.2 storage or RAM, which must be factored into your spending. Yet, it's still a very compelling distillation of mobile technology in a super SFF format for those that demand such a thing.

I can't wait to see the third party lids and enclosures that the latest NUC designs will undoubtedly stimulate.

mm Mark Pickavance

Specifications

- **Processor** Intel 5th Generation Core i5-5250U (1.6GHz up to 2.7GHz Turbo, Dual Core , 3 MB Cache, 15W TDP)
- **Memory** Dual-channel DDR3L SODIMMs
  1.35V, 1333/1600/1866 MHz, 16GB maximum
- **Graphics** Intel HD Graphics 6000
  1x mini HDMI 1.4a
  1x mini DisplayPort 1.2
- **Audio** Up to 7.1 surround audio via Mini HDMI and Mini DisplayPort
- Headphone/Microphone jack on the front panel
- **Peripheral** 2x USB 3.0 ports on the back panel
- **Connectivity** 2x USB 3.0 ports on the front panel (1x charging capable)
  2x Internal USB 2.0 via header
  Consumer Infrared sensor on the front panel
- **Storage** Internal support for M.2 SSD card (22x42, 22x60 or 22x80)
- **Networking** Intel 10/100/1000Mbps Network Connection
  Intel Wireless-AC 7265 M.2 soldered-down, wireless antennas (IEEE 802.11ac, Bluetooth* 4, Intel Wireless Display)
- **Enclosure** Silver with Black Top and Diamond Cut around the Top
  Aluminium and Plastic
  Dimensions : 115mm x 111mm x 32.7mm
- **Power Adapter** 19V, 65W wall-mount AC-DC power adapter
  Multi-country plugs (IEC types A/C/G/I)
- **Additional** Support for user-replaceable 3rd party lids
  NFC and AUX_PWR headers
  OS certs: Windows 8 & 8.1 Logo
  VESA mount bracket and mounting hole support
  Low-acoustics active cooling design
  Kensington lock support
  Integration Guide
  12-19V DC Power Input
  3-year Advanced Warranty Replacement

A Super-small, uber-powerful and irresistibly cute PC design

SteelSeries Siberia Elite Prism Gaming Headset

Remember, Big Ears is a friend of Noddy, and not just name calling

DETAILS

- **Price: £170**
- **Manufacturer: SteelSeries**
- **Website: steelseries.com**
- **Required spec: Windows or Mac OSX, USB port or any device with a 3.5mm audio jack**

Back in *Micro Mart* 1293 I reviewed the SteelSeries Siberia Elite, and described them as 'just marvellous'. What I liked about that design was that they were headphones you could wear all day without discomfort, and the new Siberia Elite Prism continues that legacy.

However, cosseting your lugs has made these rather large – in a way that makes you look like Princess Leia, sporting dual Danish pastry hair. It's a retro fashion statement, of sorts. Technically, these have been built mostly with the serious gamer in mind, and combined with the included cable collection they can be used with the most computers and Sony PlayStation consoles. What they don't work with out of the box is the Xbox One, though there is an adapter available that addresses the omission.

PC or Mac users can install SteelSeries Engine software that allows you to access some of the Elite Prism's finer features through its interface. Those include the built-in microphone, programmable audio settings, Dolby Headphone support and even RGB adjustable LED lights. Everything SteelSeries makes must glow these days, so with these you can have them pulse red, white and blue in unison with your SteelSeries mouse and keyboard, if – for reasons we have no understanding of – that pleases you. There is also a sharing jack so that your special friend can jack into the same sounds you're hearing via a pass-through capability.

Comparing it with the predecessor, SteelSeries have made some nice tweaks that are mostly aimed at making them adjustable for an even greater range of head sizes and ear shapes. They've also worked on the microphone to cancel extraneous noises and therefore improve voice clarity.

Further audio enhancements come through an integrated sound processing feature, which those using a PC can utilise by connecting using USB. These chips process Dolby ProLogic IIx and Dolby Headphone audio for you, rather than expecting the PC to have these functions. And, because of that aspect, you really need a PC (or Apple Mac) in order to get the full Prism Elite experience.

One slightly jarring detail is that the standard cable is just 1.2m, which seems long enough to plug in, but too short to allow you to easily move you head around.

Thankfully, SteelSeries did include a 2m extension, but I would have preferred it to have swapped these wires around, so you wouldn't need the extension most of the time. The aesthetics of these things is very much a personal choice, but I found the black models to be much less prominent than the white pair I got to review.

As for the price, it's the same as that of the original Siberia Elite. Regardless of how you view spending that much money for headphones, it's impossible to describe them as cheap. SteelSeries does make some very serviceable alternatives – like the Siberia V3 and RAW – for less than £100, though.

However, the quality of construction and parts is significant factor in the cost here, and that needs to be considered when making a purchase. I wish these were cheaper, but sadly they're not.

mm Mark Pickavance

Features

- Suspension design
- Intuitive controls
- Dolby audio processing
- Long wear comfort
- Noise-cancelling mic

Big luminous cans with big sound will leave you with warm ears

Sharkoon Shark Zone H40 Headset

A new headset that sounds too good to miss

DETAILS

- **Price: £50 (see Beyond Technologies for latest pricing)**
- **Manufacturer: Sharkoon**
- **Website: goo.gl/0DlOCE**
- **Required spec: Spare USB port, headphone and mic ports**

The recently released Sharkoon Shark Zone H40 headset looks to take on the current shelf favourites – Turtle Beach, Roccat and Razer – but does the H40 have what it takes to make an impact? The H40 takes on the visual aesthetic of the rest of the Sharkoon Shark Zone range, a matte-black finish with a helping of bright yellow. In the case of the H40 headset, the flashes of yellow come from the lengthy cable and LED lit ear cups, complete with Sharkoon logo and an LED at the tip of the mic.

The design works well throughout, from the comfortably padded headband down to the equally padded ear cups. The mic swivels around the outer diameter of the left ear cup on a kind of hidden hinge affair that works exceptionally well. The headband itself is adjustable and can fit child- to adult-sized heads easily enough, but there's not a lot of movement from the ear cups themselves. However, they are padded enough to ensure there is a good level of external environment noise cancellation.

There are a decent sized pair of 50mm drivers housed in the cups, that output to a very good quality. Bass is good, mid-range frequencies are clear and there's even a reasonable higher range on offer here. Naturally they can't quite hit the same levels of clarity as say a Roccat Kave XTD, but once you've got them on and immersed in either gaming of watching something you'll barely notice the difference.

> **"The sound is fine, the mic is good and the headset is more than comfortable"**

The microphone is also well designed, and projects your voice clearly – without any hint of distortion or excess background noise. Again, we like the ratchet-feel of the way it can swivel out of way and the active, yellow power on indicator. There's a basic control in-line, which allows you adjust the volume level and a sliding button for powering the mic mute on or off. The remainder of the cable then terminates in the standard mic and ear jacks and USB to provide power for the LEDs. One thing we would have liked would be a slightly longer spread of the three terminating connections. There's probably about 11" from the cable joint where it branches out to the three connections and while that's usually enough, we did have to juggle some connections to have each connection reach their port. Perhaps another four inches would be helpful?

Aside from that there's little fault the H40. The sound is perfectly fine, the mic is good and the headset is more than comfortable to wear for any length of time. Furthermore, the price is nicely pitched for the shelves as well. At just £50, the Sharkoon Shark Zone H40 isn't going to break the bank, but it does deliver as well as the competition.

We were quite impressed with the H40, as we have been with most of the Sharkoon products we've had of late. Although you may be able to grab a headset for near half the price of the H40, we're willing to bet it'll lack some of the features of the H40.

mm David Hayward

A perfectly good headset at a reasonable price

GROUP TEST

High-end Motherboards

Budget and mid-range motherboards are all fine and well and serve a purpose. But every so often it's nice to see just what the top-of-the-range performers have on offer.

With that in mind, we sent David Hayward delving into a box of excellent motherboards, and he's fished out six worthy competitors to test this week.

High-end Motherboards

Gigabyte X99 Gaming 5P

DETAILS
- **Price: £210**
- **Manufacturer: Gigabyte**
- **Website: goo.gl/x19sLk**
- **Required spec: LGA 2011-3 CPU, DDR4 RAM**

"The Gigabyte X99 Gaming 5P is certainly a good example of an X99-based system"

The X99-based motherboards have proved themselves to be a popular choice for system builders, whatever their budget might be. It's hardly surprisingly really, because the range is varied, and there's plenty to like about a well-designed X99 board.

The Gigabyte X99 Gaming 5P is certainly no exception. This is an extremely capable E-ATX motherboard that supports Intel Core i7 Extreme Edition processors from the LGA2011-3 range. There are also eight DDR4 DIMM slots for a maximum of 128GB of memory, two PCIe x16 slots running at x16, a further two PCIe x16 slots running at x8 and three PCIe x1 slots. Needless to say, there's support for CrossFire or SLI setups for two, three or four graphics cards.

Its graphics capabilities are good, but there's an ace up the X99 Gaming 5P's sleeves in the form of a Creative Sound Quad Core 3D chip, with support for Sound Blaster Recon3Di. That means access to high-definition sound, which will no doubt pique the interests of the gaming audiophile, especially since you'll also find S/PDIF out and a 5.1-channel audio connection on the backplate.

Speaking of connectivity, the backplate has a reasonable amount of available ports. There's gigabit Ethernet with a Qualcomm Atrheros Killer E2201 LAN chip, six USB 3.0 ports, four USB 2.0 ports, PS/2 mouse and keyboard ports and an empty bracket for connecting a wi-fi antenna. Oddly, though, there's no USB 3.1.

The board itself has dual M.2 Socket 3 connectors – one for an SSD and the other for a wi-fi module. There are also ten SATA 6Gbps connectors, a single SATA Express connector, digital power controllers, server rated chokes and high-quality solid-state capacitors.

Cooling is good too, with a long heatpipe leading from the VRM to the large PCH heatsink. And for those of you who like to pimp your systems, as it were, Gigabyte has included an LED lighting strip across the back of the motherboard, which also lights up the backplate and can be programmed in a range of static colours or to pulse to the beat of the music that's being played through the audio jacks.

The X99 Gaming 5P is nicely laid out, and there's enough space for four decent-sized GPUs without there being too much of an issue with airflow. One problem, though, is the lack of space between the M.2 slots and PCIe 2, 5 and 6 slots. If they were loaded up, as they often can be, then squeezing in an M.2 wi-fi module and SSD could prove to be extremely difficult.

That said, it's not impossible, and once you load this up with an i7-5960K, 16GB of DDR4 RAM and a pair of GTX970 cards, you're in for a very special gaming experience.

The Gigabyte X99 Gaming 5P is certainly a good example of an X99-based system. The inclusion of USB 3.1 would have been a better extra instead of perhaps the lighting, but when you factor in the superb audio capabilities and the reasonably good PCIe, multi-GPU layout, it makes up for that.

MSI Z97 XPower AC

DETAILS
- **Price: £290**
- **Manufacturer: MSI**
- **Website: goo.gl/D5MJ0h**
- **Required spec: LGA 1150 CPU, DDR3 RAM**

When MSI goes about producing a monster motherboard, it does it with a will. The Z97 XPower AC is the flagship Z97 motherboard from MSI, and it's a beast. Along with its sibling boards, the Z97 MPower and Z97 MPower MAX AC, the it's a stunning-looking piece of technology, with plenty going on behind the visually pleasing exterior.

This E-ATX motherboard supports Socket LGA1150, fourth- and fifth-generation Intel Core processors and has a bank of four DDR3 slots taking a maximum of 32GB. For graphics and other expansion cards, you'll find five PCIe x16 slots that can easily handle a quad GPU CrossFire or SLI setup. There are also a pair of PCIe x2 slots and a single M.2 slot.

Backplate connectivity is certainly good enough for most users. There are a pair of PS/2 mouse and keyboard ports, eight USB 3.0 and two USB 2.0 ports, a six-port audio block, HDMI, DisplayPort, gigabit Ethernet and a single Clear CMOS button. Additionally, there's a gap to house the included wi-fi block and dual antennas. Again, though, as with the Gigabyte X99 Gaming 5P, there's no USB 3.1.

However, what the Z97 XPower may lack in DDR4 and USB 3.1, it certainly makes up for with some of the most professional overclocking capable hardware we've seen on a modern motherboard.

Not only does the Z97 XPower have all MSI's usual high-quality Military Grade solid-state caps and other components, but it also features a redesigned layout that increases the number of PCB layers, humidity resistance and increased ESD protection. MSI has even taken advice from numerous professional overclockers and created more space around the CPU to fit elaborate cooling solutions. This of course means you'll be able to fit the far bigger fans and liquid coolers that most other motherboards wouldn't be able to handle.

Furthermore and as an increased lure to those who squeeze as much processing power out of their systems as possible, MSI has included a built-in liquid cooling heatsink that sits over the VRM and PLX bridge chip. All you need to do is hook up your liquid cooling system to the pipes and you'll have a cooled area surrounding the entire CPU socket.

Overclocking is what this board was born to do, and it does it with extreme style and ease. Not only is the motherboard software capable of tweaking everything on the board, but you'll also have access to a range of buttons and switches on board that will overclock, underclock, reset and even completely wipe the motherboard of all previously applied settings. There are too many options to get into here, but suffice to say you'll be able to increase the processor speeds in either 0.1MHz or 1MHz increments. And one final note: there are even support struts to hold a fan that's angled directly over the CPU socket for added cooling and ease of access when overclocking.

All of this may seem a little extreme for most users, but to the avid overclocker and extreme system builder it's music to their ears. So although there are some features lacking, the MSI Z97 XPower AC is an extremely desirable top-of-the-range motherboard.

MSI X99A XPower AC

DETAILS
- Price: £280
- Manufacturer: MSI
- Website: goo.gl/pv5FJw
- Required spec: LGA 2011-3 CPU, DDR4 RAM

Staying with MSI for the moment, we now have the company's flagship X99-based motherboard. And if you thought the Z97 XPower AC was impressive, then wait until you get a load of this.

We've already seen an exceptional X99 board from Gigabyte, so we were interested to find out what MSI would bring to the table. We weren't disappointed.

The MSI X99A XPower AC is another E-ATX board, which supports LGA Socket 2011-3 Intel Core i7 Extreme Edition processors. There are two banks of four DDR4 DIMS for a maximum of 128GB of memory and four PCIe 3.0 x16 slots for a quad GPU, CrossFire or SLI setup. Plus, there's an additional PCIe x1 slot and an M.2 port located opposite the PCIe x1 slot.

Backplate connectivity is very good in this case, with a single PS/2 keyboard and mouse port, a pair of USB 2.0 ports, eight USB 3.0 ports and two USB 3.1 ports. There's also S/PDIF out, a five-port audio block, two gigabit Ethernet ports and a clear CMOS button – as we saw with the Z97 XPower board. In addition, there's also a gap to fit the Blutooth wi-fi block and again you'll also get a couple of decent antennas in the box.

Storage is also good on the X99A. Aside from the M.2 port, there are ten SATA 6Gbps connections, two of which are reserved for SATA Express.

> **"Even the packaging is splendid and contains every conceivable cable"**

While the X99A may lack the liquid cooling pipes around the CPU that the Z97 has, it doesn't make it any less of an overclockers dream come true. As with the Z97, you'll find plenty of space around the CPU socket for bigger cooling solutions, and you'll also have access to the set of buttons and switches to step up the megahertz in 0.1 or 1MHz increments. And the X99A features the same OC and power protection as the Z97, as well as the struts to mount the overclock system fan.

There are umpteen other wonderful features that MSI has piled onto the X99A. It has just about everything, and it does it with the same sense of style and military grade quality as other MSI products.

Even the packaging is splendid and contains every conceivable cable, multi GPU bridge and SATA connector imaginable. You'll even get a USB 3.0 16GB flash stick with the drivers installed on it, as well as the more traditional optical disc.

The addition of USB 3.1 and DDR4 makes this a performance motherboard that demands to be used in the front line of any gaming setup. With a top-of-the-range CPU, memory and a set of equally impressive graphics cards, this will be the sort of fantasy system most of us price up on paper and drool over.

MSI has set the bar with the X99A XPower AC – a bar that's going to take some doing to beat.

ASRock Z97 Extreme9

DETAILS
- **Price: £210**
- **Manufacturer: ASRock**
- **Website: goo.gl/DakYy1**
- **Required spec: LGA1150 CPU, DDR3 RAM**

This is a slightly older motherboard from ASRock, although only by a few months. The Z97 Extreme9 came out late last year, competing with the likes of the Gigabyte Z97X Gaming GT and the MSI Z97 MPower Max. It fared well and, despite its age in technology terms, it can still hold its own.

The ASRock Z97 Extreme9 is an AT board that supports Socket 1150 Intel Core i3, i5 and i7 processors. It has a single bank of four DDR3 DIMMs with a maximum capacity of 32GB, and two M.2 connections, one of which is an Ultra M.2 connection.

The backplate connectivity is okay, with a single PS/2 mouse and keyboard port, HDMI, DisplayPort, optical S/PDIF out, eSATA, four USB 2.0 and four USB 3.0 ports. Additionally, there are a pair of Intel gigabit Ethernet ports, which can work in tandem, a five-port audio block and a clear CMOS button.

Internally, the Z97 Extreme9 has four PCIe 3.0 x16 slots, a single PCIe 2.0 x16 slot and a single mini-PCI Express slot. As with the other motherboards on test, you'll easily be able to set up a four-way CrossFire or SLI multi-GPU gaming monster should you wish.

Aside from the pair of M.2 connectors, the storage on the Z97 is actually quite good. You'll get ten SATA 6Gbps connections, out of which are shared a single eSATA port and the pair of SATA Express connectors.

The board is reasonably well laid out, with enough room between the PCIe slots for big graphics cards. The only problem when having a multi-GPU setup is managing to squeeze everything around a filled M.2 port. There was even ample room around the CPU socket, much like the MSI boards we've already tested.

Overclocking and performance setups are handled well. The board features good all-round quality components, large aluminium heatsinks and heat pipes. Equally, there's some room for overclocking in the accompanying software, although it's not a main feature of the board as it is with the MSI pair.

The ASRock Z97 Extreme9 is a pretty good motherboard, despite the fact that it lacks the more modern technologies of the X99A or the massive overclocking potential of the MSI Z97 and Gigabyte X99. However, its cost is equal to that of the Gigabyte X99 Gaming 5P, and if you were to directly compare the two and were ready to spend over £200 on a new motherboard, then the chances are you'd opt for the Gigabyte thanks to DDR4, better audio and overall build quality.

That's not to say the ASRock Z97 Extreme9 isn't any good; it's just that it could do with being a good £50 cheaper to make it a better choice. In the end, the choice will probably come to down to the name and whether the user prefers an ASRock product over Gigabyte.

> **"It could do with being a good £50 cheaper to make it a better choice"**

Gigabyte Z97X-SOC Force

DETAILS
- Price: £150
- Manufacturer: Gigabyte
- Website: goo.gl/xnnhD0
- Required spec: LGA 1150 CPU, DDR3 RAM

The second Gigabyte motherboard in this group is one we've come across before, as a part of a bundle sold by Overclockers UK. It's the oldest board out of the group, by at least six months, but there are enough features for it to still qualify as top of the range.

The Gigabyte Z97X-SOC Force is a fairly impressive overclocking enhanced ATX motherboard. It supports LGA1150 CPUs, Core i3, i5 and i7, with four DDR3 DIMM slots for a maximum of 32GB of 3300MHz overclocked memory. As for graphics and other expansions, there are two shared bandwidth PCIe x16 slots (dropping to x8 when both slots are occupied), two PCIe x4, a single PCIe x1 and two PCI slots. Therefore, anything up to a four-way SLI or CrossFire setup is fully supported.

The backplate has four USB 3.0 and four USB 2.0 ports, optical S/PDIF, VGA, HDMI, DVI, DisplayPort, one PS/2 port, a six audio jack block and gigabit Ethernet. On-board connectivity for storage includes a single SATA Express connector and six SATA 6Gbps connections. Alas, there's no M.2 connectivity due to the price and age of the motherboard.

The board layout is good, though, and features some extreme overclocking technology. You'll find the same sort of buttons and switches as seen on the MSI boards we've already looked at here, with a couple extra for a Turbo mode and switching between a single and dual BIOS mode.

> "Due to its age, its advantage over the rest of the group is its cost"

Additionally, there are also some decent extras on the Z97X-SOC Force, such as an added auxiliary six-pin power port for the PCIe slots, to improve system stability when overclocking and being used in high-performance setups. There are also a couple of USB ports on the near side of the board, facing where an overclocker would position themselves for testing. These enable to you to fast load configurations or install benchmark software without having to reach around to the IO ports.

There's also a good amount of space left around the CPU socket, for more outlandish cooling solutions to be used without interfering with the surrounding components. And while we're on the subject of space, there's ample room between the PCIe slots for large graphics cards.

The on-board cooling could be better, though. If you're going to partake in a spot of overclocking, then perhaps a better heatsink or the addition of a heat pipe between the two main heatsinks would have been beneficial.

Of course, due to the age of the Gigabyte Z97X-SOC Force, its advantage over the rest of the group is its cost, which being in the region of £150, is 60-odd pound cheaper than the Gigabyte X99 Gaming 5P and ASRock Z97 Extreme9. However, it's lacking in more modern components, and saving that little more will certainly yield far more extras in the long run.

On the whole, though, the Gigabyte Z97X-SOC Force is a good enough motherboard to consider if you want high-end performance but are still limited in terms of how much you're willing to spend.

ASRock Fatal1ty X99X Killer

DETAILS
- Price: £220
- Manufacturer: ASRock
- Website: goo.gl/3RLbPr
- Required spec: LGA 2011-3, DDR4 RAM

The Fatal1ty Killer series of motherboards are ASRock's premium range of high-end motherboards. The style of each of the boards, as well as the range of features, make for impressive reading.

The ASRock Fatal1ty X99X Killer is an awesome-looking piece of technology – imposing even. There's so much to take in and list that there's barely enough room on a single page to get the list of features across.

This is an ATX motherboard that supports LGA 2011-3 i7 Extreme and Xeon 18-core processors. The two banks of four DDR4 memory slots can take a maximum of 128GB, and you'll find a single Ultra M.2 connector between the first and second PCIe slot.

Speaking of which, the Fatal1ty X99X has three PCIe 3.0 x16 slots, two PCIe 2.0 x1 slots and a single mini-PCI Express slot. Depending on the type of CPU you pair with this motherboard, you'll be able to get a tri-GPU setup of x16/x16/x8 – for 40-lane CPUs, otherwise it'll be x16/x8/x4 for 28-lane CPUs.

Backplate connectivity consists of a single PS/2 mouse/keyboard port, one eSATA port, two USB 2.0 ports (one of which is a dedicated Fatal1ty mouse port), six USB 3.0 ports, a pair of gigabit Ethernet ports, a five-port audio block with S/PDIF out and a clear CMOS button.

> **"It doesn't really bring anything drastically new to the table"**

In terms of storage connectivity, the Fatal1ty is pretty well equipped. There are ten SATA 6Gbps connectors, a single eSATA connector and the aforementioned Ultra M.2 ports.

The obvious advantages the Fatal1ty offers over more conventional motherboards is the fact that it's designed for gamers. This means you're getting higher-class components, better than average cooling and plenty of motherboard software to help give you an advantage when gaming. How this compares to the other boards in this group, though, is something else.

Although there's plenty to like about the Fatal1ty X99X, it doesn't really bring anything drastically new to the table. If you were to compare it to the MSI X99A, for example, then you'd begin to see the difference in quality and features. Mind you, the Fatal1ty X99X is cheaper than the X99A by about £60.

The price is roughly equal to the Gigabyte X99 Gaming 5P, with the Gaming 5P being about £10 cheaper. Again, though, there's a difference in the quality between the two, where we think the Gigabyte X99 is somewhat better.

Having said that, the ASRock Fatal1ty X99X Killer is an impressive motherboard. The overall design is good, with plenty of space for CPU cooling kits and multiple GPUs, and it looks good too.

As we said with the Gigabyte Z97-SOC Force, though, it's probably worth saving a little more and going for the next motherboard up. Otherwise, £10 less will buy you the better Gigabyte X99 Gaming 5P.

MSI X99A XPower AC

The MSI X99A XPower AC, had the edge over the other motherboards on test. First off, it featured USB 3.1, LGA 2011-3 and DDR4, and it combined the best overclocking features of the other boards as well as connectivity.

Gigabyte X99 Gaming 5P

The Gigabyte X99 Gaming 5P is a board that can quite easily hold its own against any other manufacturer. It has a good price, considering the technology it has on board, and there's plenty of connectivity too.

How We Tested

We tested each motherboard with an assortment of processors, DDR3 and DDR4 memory, SSDs and a couple of Nvidia GTX970 cards. We decided against using benchmark numbers and wanted to focus mainly on the features and what each board has to offer, while also comparing the price.

	Gigabyte X99 Gaming 5P	MSI Z97 XPower AC	MSI X99A XPower AC	ASRock Z97 Extreme9	Gigabyte Z97X-SOC Force	ASRock Fatal1ty X99X Killer
Price	£210	£290	£280	£210	£150	£220
CPU Socket	LGA 2011-3	LGA 1150	LGA 2011-3	LGA 1150	LGA 1150	LGA 2011-3
No x16 PCIe Slots	4	5	4	5	4	3
No x1 PCIe Slots	3	2	1	1	1	2
RAM Type/Max	DDR4/128GB	DDR3/32GB	DDR4/128GB	DDR3/32GB	DDR3/32GB	DDR4/128GB
No SATA	10	6	10	10	6	10
No M.2 Connectors	2	1	1	2	0	1
No USB 2.0 Ports	4	2	2	4	4	2
No USB 3.0 Ports	6	8	8	4	4	6
No USB 3.1 Ports	0	0	2	0	0	0

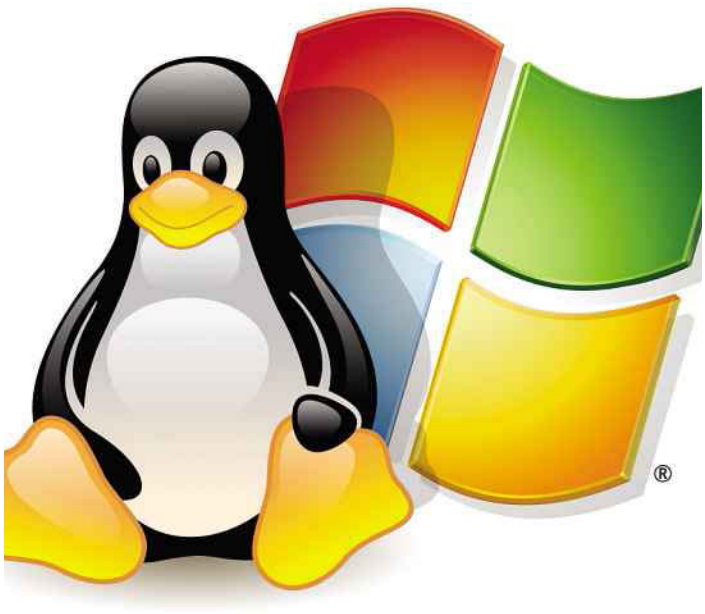
Your Letters

Windows Vs Linux

I can see reading Ken Hough's response to my letter in issue 1353 that we'll never 'agree', as I strongly suspect we are actually discussing different things. I feel he is dodging the issues I raised (and I suspect he feels that I am doing the same). Thus, though I'd happily discus the topic at great length I'll stop in this forum before it becomes too much like pantomime.

However, I will absolutely agree with him on one topic: the behaviour of Microsoft! The Windows OS, love it or hate it, always had one real advantage: you could do virtually anything with it at reasonable cost. Every change Microsoft makes detracts from this flexibility and usability, whilst offering nothing useful instead. A continual process of de-featuring Windows and their flagship product MS Office. The latter in particular has got clumsier and clumsier to use, and simple features are hidden or removed. They are increasingly following the Apple 'do it my way or not at all' approach without the appeal that Apple have managed to put into their limited product set. As Dave Shaw points out in the same letters page in issue 1367, many of us just don't have the internet structure to cope with Microsoft's vision of the all connected internet.

Dick Pearson



Download Speed?

Dave Shaw's download speed drops to 10Kbps 200m from the exchange?

Surely there's something wrong there.

I live approximately 4km from our rural exchange in an area where cables hang down into the hedges and landowners utilise rope to keep them out of the road. My broadband speed is naturally appalling, but it's never dropped to 10Kbps. I normally expect 600-900Kbps with >250Kbps at the worst times. Meanwhile, BT spends our money buying football coverage.

I'd complain, Mr Shaw; it won't get a result, but it might make you feel better.

Andy Grenyer

Fair Play

I enjoyed the recent article 'Building A Console Killer', and I think it's interesting when you take into account the 'family hub' story in the same issue (MM1367). Games consoles have their place, for sure, but both these articles show why they'll never be able to beat PCs.

I'm not a hard-core gamer by any means, but I do enjoy the odd play now and then. And I know that if I wanted the very best performance and graphics, then I'd get them from a PC, not a games console.

But like I say, I'm not that into games, so that's not the reason they're better for me. Personally, I think it's because I know that when my current PC gets old and is no longer able to keep up with modern games or applications, it'll still have a use – as a family hub or something else.

Compare that to a console, which is just going to end up in landfill once it's done with and the next shiny new box is out. With a PC, I know that I can always find a new use for it, even when it's old and seemingly out of date. Maybe it won't be able to run the latest version of Windows, but no doubt there'll be a Linux distro or something I can install.

How many games consoles can you claim do that?

Thom Jackson

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Stephen Elop Natural Born Winner

Mark Pickavance looks at Stephen Elop, the ex-CEO who infamously made huge amounts out the failure of Nokia, the company he once controlled

On 17th June, Microsoft CEO Satya Nadella made public a series of structural changes within his company. One of these was to consolidate the Microsoft Devices Group under the Windows Division, with the new entity to be headed by Terry Myerson.

Devices had previously been the fiefdom of Stephen Elop, who Satya explained was leaving by some degree of mutual consent. "Stephen and I have agreed that now is the right time for him to retire from Microsoft," Nadella said.

Having made his reputation at Microsoft, only to leave and head Nokia and then return, the departure of Elop marks the end of an era.

What did Elop achieve in his two tenures at Microsoft and, between that, at Nokia, and is there a lasting legacy of the Elop era?

Elop Ascension

A Canadian by birth, Stephen Elop studied Engineering and Management at degree level, before a brief career at Lotus Development Corporation in the late 80s. After that came six years as CIO (chief information officer) at Boston Chicken, before it filed for Chapter 11 Bankruptcy protection, at which point he joined Macromedia.

That company was subsequently bought by Adobe, and he moved again to Juniper Networks, before his big opportunity to join Microsoft came in 2008, when he became head of its Business Division. How he got such a big job controlling the part of Microsoft that makes roughly half the income isn't well documented, but in the two years he ran that department, it launched Office 2010, a product that kept the dollars flowing into Microsoft's coffers.

But after a relatively short time, and with no sign that Steve Ballmer was ready to retire, Elop looked outside the company for his next meteoric jump up the ladder.

In September 2010, he replaced Olli-Pekka Kallasvuo as CEO of Finnish phone giant Nokia, the very first (and last) CEO that wasn't born in Finland.

➤ *Once rumoured to be the man to replace Steve Ballmer, Stephen Elop came back with the carcass of Nokia, but it didn't earn him a job for long*

He was just 47 years old, and he was controlling a company with more than 130,000 employees and the largest maker of mobile phones in the world.

How wrong could it go?

Nokia

At the point that he became CEO, Nokia was in a strange place, where it was still a huge worldwide supplier of phones and massively respected, but the impact on the market of Apple's iPhone range was beginning to bite.

Years of complacency had seen Nokia intentionally stifle development, and its acquired Symbian OS wasn't remotely up to the job of transitioning the high-end products to exploit the market Apple was creating. It had a new and potentially credible alternative in the form of Meego, but under-investment mean it this wasn't nearly polished enough for an orderly transition away from Symbian.

To his credit, Elop realised the predicament that Nokia faced and issued an internal memo entitled 'Burning Platform' that ultimately became public. In the memo, a parallel was presented between Nokia's dilemma and someone trapped on a burning oil platform (Piper Alpha?), where staying wasn't an option, but jumping might be just as deadly.

Opinions were finely divided over this memo, because some in the company wanted it to wake from its zombie-like state, while others were shocked that things like this were being said so soon after Elop walked through Nokia's doors.

However it was taken, less than six months later, both Symbian and Meego development was halted, and Elop announced that the future lay with Windows Phone 7, a Microsoft product that was only a few months old. There was only one Meego phone ever launched by Nokia, the N9, though curiously Nokia also made a really poor Android phone at this time, the Nokia X.

With the appearance of the Lumia devices, which looked just like the now defunct N9, Nokia became the main supplier of Windows Phone devices (though not exclusively), and it released a range of generally well received devices. They might have been liked by reviewers, but they weren't a hit, either with the buying public or phone service providers, and the notion that Nokia would make a seamless transition to the new OS while retaining market share soon evaporated.

"Since the company and Elop transferred back to Microsoft, it hasn't launched a single flagship product"

By the middle of 2013, Nokia had reached a point of no return, where sales had effectively collapsed and together Android and iOS devices entirely dominated the billion or more smartphone sales per year.

Microsoft had already invested $5bn in Nokia to keep making the Lumia range, but the company's impending collapse endangered that strategy. An acquisition was negotiated, and the phone making part of Nokia became the mobile division of Microsoft for $7.2bn.

The deal also involved Elop standing down as Nokia's CEO, but re-employed as executive vice president of Microsoft's Devices & Services business unit. In the five years he'd run Nokia there were 21,000 layoffs, revenue fell by 40%, sales volume by the same ratio, and he'd wiped 85% off the stock value.

For him personally it was a very different story, one with lots of noughts behind it.

Success Through Failure

When Stephon Elop first went to Nokia, he managed to swing the sort of deal that few others in Finland have ever managed previously. The tax model in Finland has a progressive structure much like the UK, where the more you earn, the higher the tax bands you will encounter. But Elop's tax status was a unique one where he got to pay a maximum of 35% fixed rate, regardless of what he earned.

This deal worked massively in his favour when he sold the business to Microsoft, because part of that arrangement saw him given a 18.8 million bonus – something that was a

➤ *Stephen gets a call, hopefully not from any ex-employee of Nokia*

spontaneous renegotiation of his contract on the very day of the acquisition. The excuse that was provided later was that Stephen needed the money to fund his divorce, like this is somehow the responsibility of the company he once worked with.

What didn't help was that Risto Siilasmaa, Nokia's chairman, initially claimed that the massive payoff was reasonable by saying that the terms were "substantially similar to those of former Nokia CEOs". And then he was forced to admit that due to a mistake that was made in the contract, he had in fact walked away with 14.6m more than the previous Nokia CEO, Olli-Pekka Kallasvuo. Truth – it's a slippery beast at best.

When this was made public, Nokia openly asked that Elop accept a smaller bonus, which he refused, citing his aforementioned divorce as why he needed it all.

This was the last in a pretty large list of payments that Elop got from Nokia, which had paid him a $6.2m 'golden handshake' when he joined the company in 2010, on top of his $1.4m salary for that year.

But it wasn't just Nokia (or was it himself?) throwing money at Elop; the cash just kept coming at him from all directions.

In the following 14 months from the Nokia takeover, Microsoft paid $18m dollars for the joy of his company – or $1.3m a month.

During this time he penned the amazingly insensitive memo telling a further 12,500 ex-Nokia people that their services were no longer required, which inappropriately started "Hello there".

If you've ever seen the classic final episode of the UK version of *The Office*, where David Brent tells his staff that they've all lost their jobs, but he's got a new better paid one, then you've got the flavour of that memo already.

It takes a mind-numbing 11 paragraphs of Elop talking about "creating the hardware that showcases", "appropriate financial envelope" and "to continue to enrich the Windows application ecosystem" before he finally tells them they don't have a job.

With Nokia now part of Microsoft for good (or more probably bad) and most of its staff handed their marching orders, there was only one person who needed to clear their desk, and that was their beloved leader.

What his settlement deal is hasn't been revealed, and as he's one of the senior people that Microsoft doesn't reveal financial information about to SEC, we may never know. But given his track record, divorce or not, he probably won't ever need to work again, whatever the lifestyle is he chooses to lead.

The Elop Legacy

It's hard to gauge his performance at Microsoft prior to Nokia, because Office 2010 was in development long before he arrived, and that division has made lots of money even when Microsoft has entirely mucked up its Windows launches. But at Nokia his influence was less ambiguous and has in some quarters been categorised as the 'Elop effect', as a variation of missteps that have been made by such industry legends as Adam Osborne and Gerald Ratner.

Infamously, Adam Osbourne showboated that future models of his portable computers would massively outperform the existing line-up, immediately killing the market for those products, with their replacements some considerable way off.

And the unfortunate Gerald Ratner, CEO of British jewellery group Ratners (now Signet Group), went on record to say that the reason it could sell the products it made for such low prices was "because its total crap."

Elop's twist on both of these strategies was to immediately devalue the efforts of a large part of the company he'd just taken control of and then to entirely hitch Nokia's wagon to an unproven technology with no established market, and which Microsoft hadn't properly funded or supported prior to this point.

By ending Symbian development so promptly, he painted all those existing products as being worthless and then admitted

> **"What he did was turn Nokia's own fiasco, admittedly of its own making, into a huge success story for him personally"**

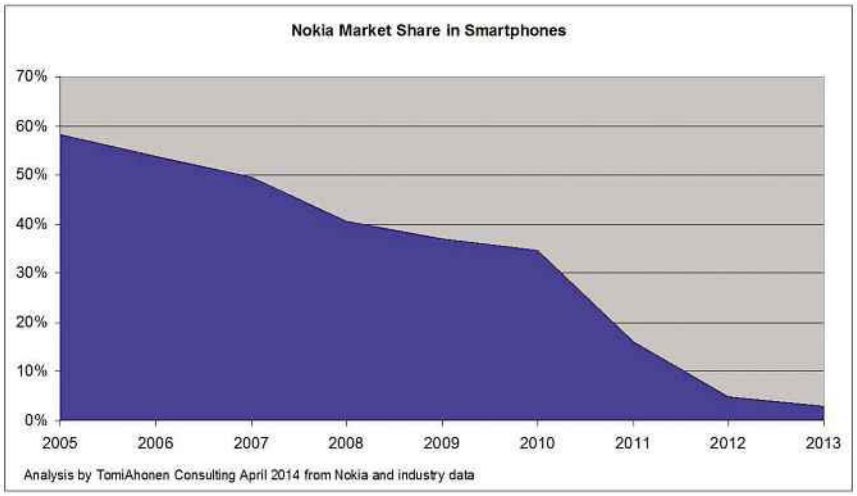
that no new products would be replacing them for at least nine months. The impact on the market for Nokia products plummeted dramatically, and when they did appear, the arrival of Lumia-branded products did little to slow the rapid descent.

What many forget is that while not doing brilliantly before Elop, Nokia in the quarter before he took over managed to grow smartphone unit sales by 7%, average sales prices by 14% and unit sales revenues by 22%. Post-Elop unit sales dropped 41% and revenues 47%. A profit of $640m became a loss of $230m, so that's a move in the wrong direction of nearly a billion dollars.

Big staff reductions, stopping development and other cost reduction exercises only made disastrous figures seem marginally better and led to only one inevitable conclusion. Microsoft, now almost entirely dependent on Nokia to remain a player in the mobile space, ended up buying the company, which was predestined from the point that Nokia became wholly dependent on Windows mobile OS.

The closeness of this relationship also put off other phone makers from supporting Windows Phone, forcing Microsoft's hand when it was apparent that on its own Nokia wouldn't survive long.

The Meego OS N9 phone was a future that Nokia never explored once its relationship with Microsoft was cemented



Nokia's smartphone market share was in decline from before 2005, but once Stephen Elop took control in 2010 it plummeted to less than 5% in short order

I've seen it argued that the underlying job of the CEO is to get good value for his stock holders, regardless of the employees' wishes. But that's not the story of Nokia, because the crash in stock value that proceeded the changes and the massively reduced worth of the company part that Microsoft ultimately bought represented just a fraction of what stockholders previously held.

Since the company and Elop transferred back to Microsoft, it hasn't launched a single flagship product in the Lumia line, and instead it seems content to mine the low-cost feature phone market with what are supposedly smartphones.

At this point, Microsoft's mobile product range is no more of a threat to Google and Apple than BlackBerry now is, and if anything the small market share it once carved out is shrinking towards 2%.

Final Thoughts

I've seen quite a few pundits claiming that Stephen Elop did rather well with Nokia, considering the state he found it in 2010 when he became the CEO. I can't really find it in my heart to be that generous, given the desolation he ultimately unleashed on that company and its employees.

What he did was turn Nokia's own fiasco, admittedly of its own making, into a huge success story for him personally. That huge bank balance he accrued didn't extend to almost anyone else who worked for the company when he took over. It was a singular triumph against a panoramic background of financial loss for almost everyone else involved.

A more cynical position that I'd probably support is that the rise and success of this man is a shining example of how once people get to a certain level in organisations (and government) they're rewarded mostly for abject failure – and often quite gratuitously.

Nokia as a phone company no longer exists, most of the people who worked for it are employed elsewhere (hopefully), and Microsoft stands astride the smartphone market brandishing an abysmal 3% market share like it's a winning lottery ticket. There's also lots of talk now that Satya Nadella really wants to have done with the Window Phone products altogether, because buying Nokia wasn't something he supported initially.

Unless the arrival of Windows 10 turns around Microsoft's mobile fortunes is short order, and I doubt that's even possible, then Terry Myerson will soon be available to play golf with Stephen Elop, if they're friends.

Satya: Last quarter we sold over eight million Windows phones worldwide!
Stephen: Surely I'm due an enormous bonus then?
Satya: In the same period, Android sold 265 million and Apple 60 million, and our share dropped to 2.5% from 2.7% in the previous quarter.
Stephen: I'll get my coat…

But does he really care? Well, given how much cash and share options he holds these days, you'd think not, but then he's quite egotistical, and coming back to Microsoft and not being offered the CEO role must irk him severely.

For that reason, I'd be surprised if we've heard the last of him, as there are plenty of other drowning tech companies out there that would like a known name as CEO and the possibility of being bought out by Microsoft down the line.

The problem for Satya Nadella is that with Elop gone and Myerson now saddled with both Windows 10 and devices, there's less of a meat-wall between any perceived failure and himself. Should Windows 10 fail to deliver the success that Microsoft's investors expect, it's not like they have enough time to rehire Stephen Elop and hang that albatross around his neck.

In the final analysis, this is a man who was a triumphant success at being Stephen Elop, the super-rich corporate person. At other roles, most notably CEO, evidence of positive achievement seems more challenging to identify. **mm**

Do You Need A Touchscreen?

Is a touchscreen monitor or a laptop with a touchscreen really useful? **Roland Waddilove** looks at the hardware and the software

Smartphones that did away with the keyboard and just used a touchscreen interface have led to a revolution in handheld devices, but the technology has spread to PCs too. Microsoft has been pushing the technology for a long time, with support is built into Windows 8. Touchscreens are becoming increasingly popular (at least with manufacturers, if not users), and it's likely that your next laptop computer or desktop PC monitor will be touch enabled. Is this a passing fad like 3D TV that few people really want, or is it a useful feature of modern computers? Let's take a look at the hardware and software you need to ditch the keyboard and mouse.

Touchscreen Computers

The success of tablets and smartphones with touchscreens has inspired PC manufacturers to come up with some unusual designs that incorporate touchscreens. Some models, for example, have tear-off screens that separate from the keyboard, and then you can continue working by using the screen like a handheld tablet.

A perfect example of this is the Microsoft Surface, but it's not the only one. Microsoft is still selling the older Surface 2 and Surface Pro 2, but although you could save a bit of money over the latest versions, you're much better off with a Surface 3 or, better still, the Surface Pro 3, which has an improved specification, a more modern design and can cope better with the latest software.

A Surface 3 costs £419, but you'll want to add the optional keyboard that doubles up as a cover when travelling. It adds £110 to the price, making it £529 in total, which isn't bad for such a lightweight, ultra thin and portable laptop. Microsoft likes to call the Surface a tablet, but anything that runs Windows and has a keyboard and screen is surely a laptop.

The specifications are reasonable and a whole lot better than older Surface models. The solid-state disk is a 64GB, which is just about the smallest size you want for running Windows 8 or 10. The screen is 10.8 inches a and 1920 x 1280 pixels, and there's an Intel Atom x7 processor.

If you want a top-quality, touchscreen, ultra light laptop and you have the money, the Surface Pro 3 is a good choice. Including the optional keyboard/cover, it costs £749 for the lowest specification. This has an 12" 2160 x 1440 touchscreen, 64GB of solid-state

The Asus Transformer can be used as a Windows laptop with touchscreen or a tablet

Microsoft's Surface Pro 3 is a great laptop/tablet hybrid with a touchscreen and great specs

storage, 4GB of RAM and an Intel Core i3 processor. A top-of-the-range model with twice the RAM, four times the storage and an Intel Core i7 processor costs £1,239 with the cover.

While Microsoft has opted for a tear-off touchscreen, Lenovo has taken a different design route with the Yoga 3 Pro. The screen doesn't just open up in a clamshell design; it keeps going and folds flat against the back of the keyboard. This enables the device to be used as either a laptop or a tablet.

The Yoga 3 Pro has what Lenovo calls a watchband hinge, and the company (and Ashton Kutcher – you must have seen the ads) claims it's the world's thinnest convertible laptop at just 12.88mm thick. Compared to modern tablets, though, it is quite thick with the screen folded back, but even so, it's thinner than the original iPad, although it is a bit heavier. The base model is priced at £999 and has an Intel Core M-70 processor, a 13.3" 3200 x 1800 screen, 8GB RAM and a 256GB SSD.

The Asus Transformer Book T300 Chi is different again. This laptop/tablet hybrid in some ways is like a Microsoft Surface, because it has a tear-off screen, but it has a real laptop-style keyboard. With the keyboard attached to the touchscreen, you would think it was a standard ultra-thin Windows laptop, but pull off the screen and it works like a regular Windows tablet. The base specification is an Intel Core M processor, 4GM RAM, 12.5" HD screen, 128GB solid-state disk, and it weighs 1.4kg (screen and keyboard). Shop around and you can get one for as little as £700, which is quite cheap for a hybrid.

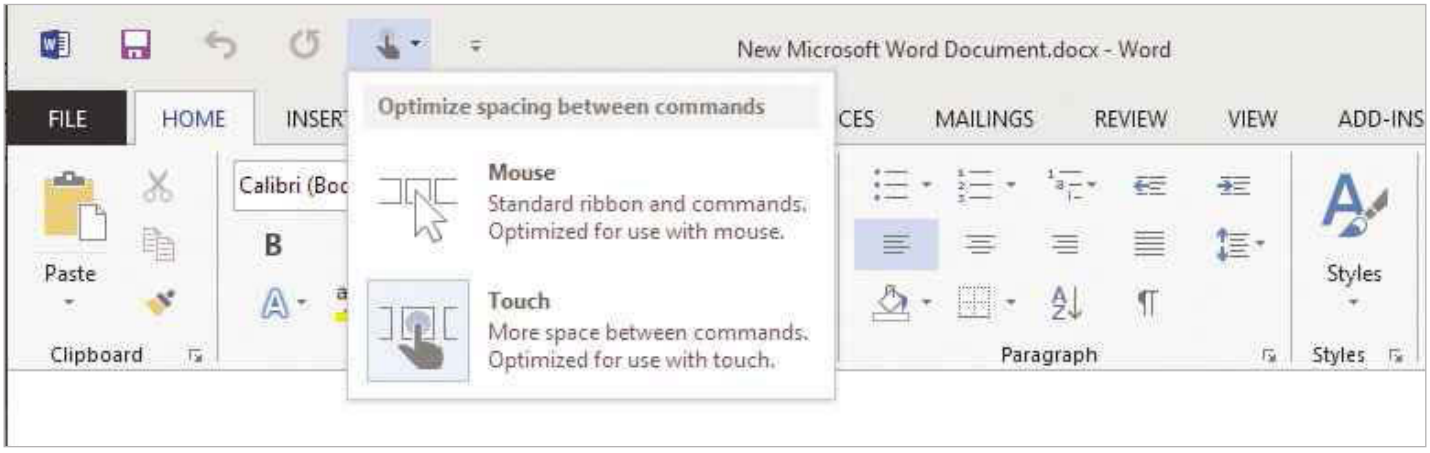
> **Microsoft clearly thought that touchscreen computing was the future**

Go to the laptop section of the HP website and filter by touchscreen, and there's a huge range – 19 models in fact. Many of them are standard laptops, some are ultra thin and light, some can rotate the screen right the way around and so on. There's a wide variety of touchscreen laptops ranging from the HP Pavilion x2 Detachable Laptop 32GB priced at just £199, up to the HP Omen 15-5000na Gaming Laptop costing £1,399. Other manufacturers like Dell also have touchscreen laptops in their range.

It isn't just laptops that have touchscreens: the next time you buy a monitor for your desktop PC, it will probably be a touchscreen. Every monitor manufacturer (Acer, Dell, Hanns.G, Iiyama, ViewSonic and others) produces touchscreens. They come in all sizes from 23" desktop monitors costing around £150, up to the 80" monster Sharp PN-L802B that's over £9,200.

Touch-enabled Software

Microsoft clearly thought that touchscreen computing was the future, and it overhauled Windows 7 and redesigned it for touch. Windows 8, with its touch-friendly Start screen, has not turned out to be one of Microsoft's best ideas, and few people love it. Many just put up with



Word can spread out its ribbon controls for touch, but it's really best with keyboard and mouse

Microsoft Fresh Paint is a brand new version of the classic art program for touchscreens

it and have learned to live with it, but a significant number of people just don't like it.

If you have a Surface or other Windows tablet and no keyboard, Windows 8 is okay, and it works reasonably well with touch. If you can avoid the desktop, which isn't easy, and you can stay with Modern Interface (Metro) apps bundled with Windows 8 or downloaded from the store, then it's fine. Swiping left and right to browse Start screen apps, pulling the charms bar in from the right and the app switcher from the left all work well with touch.

One of the problems with touchscreen PCs and laptops is that unless they're firmly held or supported, they wobble in a disconcerting way when you prod and poke them. When using a touchscreen tablet, the screen is held in one hand and you tap with the other, or you rest it on your knee. This is fine, and the screen is solid, but try tapping a 23" monitor near the top, or a laptop screen, and it makes it wobble. The only way to stop this is to hold it. You don't want to be holding your 23" desktop monitor as you use it, though. Some of the laptops and hybrids fold over, have a stand or make an upside down V shape, and these are much better for touch.

Touch works all the time and if you're using Windows desktop applications with a touchscreen laptop or desktop, quite often the interface elements are just too small. HD screens on 15" laptops have tiny menus and buttons. Although they can be used with touch, you have to be so accurate that it becomes irritating. If you want to use desktop software with a touchscreen, it's best to reduce the resolution so interface elements are much bigger and use larger buttons, menus and so on.

Some desktop software is designed for touch, such as Microsoft Office. This is hardly surprising, because it sells both the Surface and Office. Few other software developers have done anything special to accommodate fat stubby fingers poking the screen. Right at the top of the window to the left of the title is a tiny button, which is almost too small to touch, to switch Word into touch mode. This makes icons in the ribbon slightly bigger and changes the spacing between them so they're easier to tap.

Unfortunately, the effort Microsoft has put into making this a touch-enabled app is minimal. Go beyond the obvious buttons in the ribbon, and standard Windows dialogue boxes appear that are awkward to use with a finger, so touch is actually poorly integrated.

Fresh Paint

Paint has been in Windows since the early days, and as with all desktop software, it can be used on a touchscreen, but the buttons and menus just aren't designed for fingers. It's an awkward experience, so Microsoft has created a modern Windows 8 version for touchscreens called Fresh Paint. This free app is a different type of paint program, with the focus on natural paints and brushes.

Pulling down from the top of the screen displays an artist's palette, via which you can select and mix paints in a natural way. You can tap on a paint pot and then paint on the palette, tap another colour and apply paint over the top to mix them. The resulting paint can then be applied to the canvas. This means you don't get solid colours picked from a computer generated colour palette, but natural ones created by mixing paints.

> **"One of the problems with touchscreen PCs and laptops is that unless they're firmly held or supported, they wobble"**

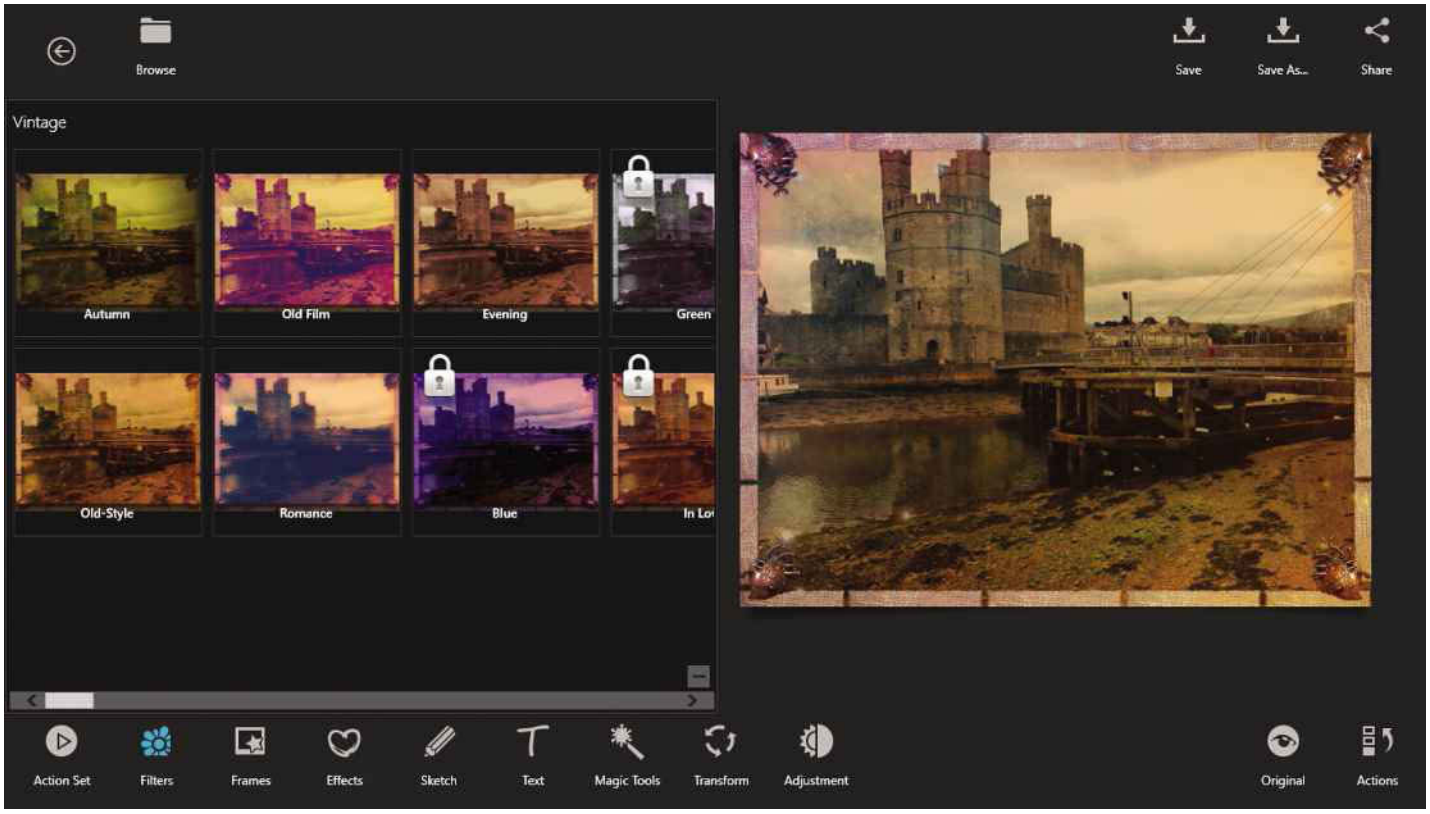
Tap a colour and a paint brush, and when you swipe across the screen with a finger, it's like brush strokes with wet paint. A quick light stroke and only a little paint is applied, but you can go over it again to apply more paint. There are two sets of paint brushes to choose from, and each contains a variety of thick and thin brushes. There are also set of coloured pencils and coloured crayons. Anyone with a bit of artistic talent will love this touch-enabled paint app.

Spending Tracker

Spending Tracker is a tool for tracking where your money is being spent each month. Excel, with its large collection of functions, will do a far better job of course, but it is not particularly touch friendly. Spending Tracker works well on a touchscreen, and the controls are easy to use and obvious in their function. It's like a simple finance app for tablet users, but you can use it on your PC or laptop with a touchscreen.

Spending Tracker will keep track of your incoming and outgoing money

App Radio is a super-simple internet radio player that works brilliantly



KVADPhoto+ has a great range of features for enhancing your snapshots

The app has two categories, expenses and income, and subcategories are used to organise the various types of incoming and outgoing money, such as household bills, car and fuel bills, entertainment, eating out and so on. Some text input is required, so an on-screen keyboard is displayed, but some information can be entered in true touch style. For example, tap a category and up pops a list of them, from which you tap to select. When entering the date for a transaction, the day is like a slot machine, in that you flick a finger to spin the days to the one you want, and a numeric keypad is displayed when entering an amount.

It's a handy touchscreen app that works well on a tablet. On a laptop or desktop PC you can use a mixture of touch and keyboard, tapping where it's easier and typing when input is required.

App Radio

TuneIn Radio is excellent on Android and iOS devices, but many people have found that the Windows version has a lot of problems. There are plenty of five-star reviews, but almost as many one-star ones too. If you want to turn your PC into a streaming internet radio player, get App Radio, which is brilliant and amazingly simple. In fact, there are almost no controls at all.

Start App Radio and it presents radio stations as tiles on the screen. The stations are organised into groups like Pop, Rock, News, Dance, Classic, Souls and Jazz, Oldies and so on. Nine are featured as tiles in each group, and tapping the group title reveals the rest. There are hundreds in some groups, and there are thousands of radio stations altogether in the app.

The stations are all represented as tiles with the station logo on, and you just tap a tile and it starts playing within a couple of seconds. It could not be simpler, and it works perfectly. A little panel on the left opens when a station is playing with one button to mark it as a favourite, one to stop it and a volume control. That's it, but what more do you need? If you have Windows 8 on a PC, laptop or tablet, you should get this app, because it works great with touch.

Turn your PC into an extra television and watch live programmes on Freeview channels

Freee Movies enables you to browse and view free movies on YouTube

▲ *The Nook app lets you download books and read them on your screen*

KVADPhoto+

There are several good photo editors that work well with touchscreens, and Microsoft's Photos app bundled with Windows 8 is one of them. A lot of people have tried Adobe Photoshop Express, perhaps thinking it might be similar to the desktop app, but its score in the Windows App Store isn't brilliant, at 3.5. Two photo editing apps you should definitely look at are KVADPhoto+ and Fotor. Because they're free, you could install both.

KVADPhoto+ enables you to browse the photos in the Pictures folder and load one for editing. Along the bottom are the various categories of tools and effects, which includes frames, filters, effects, sketch, text, adjustment and so on. Each of these has multiple options. Some of the items are locked, and you need to upgrade to the Pro version to use them, but there are things you can do in the free app. There are over 20 free filters, for example, and many more if you upgrade, and over 20 frames with dozens more available for purchase.

All the controls are easy to use with a finger, because it's aimed at tablet users, although it runs fine on desktop and laptop PCs with or without touchscreens. You tap a thumbnail to apply a filter, effect or frame, drag a slider to adjust the brightness, contrast or saturation and so on. The enhanced photo can be saved at the original size or one of several smaller ones.

An interesting feature of the app is that as you enhance the photo, every step is saved in an actions list. This list can then be saved so you can load another photo and click one button to apply all the actions you used previously. You can build up a library of actions if you want. This is a good free photo editor, and the Pro upgrade extends the features even further.

TVCatchup

This is another brilliantly simple touchscreen app for Windows 8 PCs, laptops and tablets. It does just one thing, which is to turn your PC, tablet or phone into a television. All the Freeview channels are available, live (well, almost: TVCatchup is about 20 seconds behind live TV).

There's a list of TV channels on the left, and you can flick through them with your finger and tap one to start it playing (after a short advert). There's a useful information panel about the current programme that's playing. Pull up from the bottom, and there is a full-screen button to remove the channel list and programme info. It's simple, it works, and no mouse is needed, although you can use one if you want.

Freee Movies

Netflix has a great app for watching the latest movies and television shows, but there are other sources of movies that work well on touchscreens too. Freee Movies for example, is a free app with no subscription that provides access to full movies on YouTube. The legality of full movies on YouTube is questionable, but the app has been approved and is in the Windows Store, so surely both Microsoft and Google must know about it. Perhaps they turn a blind eye and just quietly ignore it.

Freee Movies displays movie categories such as adventure, comedy, crime, action, science fiction, musical, romance, western and so on. Tap a category, and the movies are shown as tiles. There's nothing new, and most of the content is made up of old movies and B movies. Low budget, second rate movies are common, but occasionally there are some reasonably good ones that are worth watching again, like *The Good, The Bad And The Ugly*, *Cyborg 2*, *Hellraiser* and others.

The quality of the movies varies, and some are poor, but others are okay. The app itself is easy to navigate, with categories and movie tiles to tap, and simple play, pause and stop buttons to control playback.

Nook

Does anyone read ebooks on a desktop computer? It's possible of course, but this type of application is best suited to those hybrid laptop/tablet devices that have detachable screens. Then you can sit on your sofa or in bed and read ebooks on the screen.

There are several ebook readers in the Windows Store, and Kindle is the obvious one to go for, but curiously it has an uninspiring score of 3.0. Nook, from Barnes & Noble, is rated more highly and it has a great interface that works well on touchscreens. You can sign in with a Microsoft account, such as Outlook.com email, but you need to add a credit card to it, even if you only want to download free ebooks.

There are thousands of books to choose from, which are organised into numerous categories like humour, history, romance, teens, poetry, biography and so on. Select a category, and you can view them sorted by name, price, best selling and age. There are lots of free books you can download, plenty of classics and the very latest from top authors.

Games

There are lots of games in the Windows store and many of them are excellent. Playing them with a touchscreen desktop PC or laptop is not always ideal, though, and there are problems. One problem is screen wobble. Fast action games may require a lot of tapping, swiping and other actions, so the monitor or laptop screen sometimes wobbles around in an irritating manner. Games designed for touch controls work best with laptop/tablet hybrids that you can hold in your hand or rest on your lap. This gives them the stability you need.

Slower games are less problematic than fast action ones, and something like chess, for example, would present no issues for touch, because you spend 99% of your time thinking and only 1% actually interacting with the game.

Another issue is that a mouse and keyboard offers more precise

> **“There are lots of games in the Windows store, and many of them are excellent”**

and accurate control of the game. Again this is mainly for fast action games where precise and accurate control is needed. However, even with a board game like chess, if you have a mouse next to you, it's often easier to use it than to point and tap on the screen.

Playing *Crossy Road*, for example, is actually easier using the keyboard than a touchscreen. It's a very simple game that's a sort of cross between the classic arcade game *Frogger* and *Flappy bird*. You have to cross busy roads, rivers and railway tracks, avoiding the cars and trains. Tapping the screen make the character you control hop forwards and mostly you do want to go forwards. Turning left or right is easier with the keyboard than the screen, but if you're playing on your lap with a Surface or something similar, it's still a lot of fun.

Games like *Angry Birds* are perfect for touchscreens, because the controls are so simple. Tap and pull back the bird, let go, and off it flies, hopefully to knock down the structure in front of it. There are several official variations of the game and several clones, such as *Monkey Sling Free*.

Cut The Rope 2 is another great game that works well on touchscreens because of its simplicity. It features Om Nom, a little green creature that must be fed sweets dangling on ropes. A swipe is all it takes to cut the rope, and the sweet falls. It is not quite that simple, of course. Indeed, this is a physics puzzler that will frustrate and entertain you at the same time. The graphics are cartoon-like and the game is free and fun to play.

Tiny Troopers is a war game in which you control troops and have to complete missions like killing all enemy soldiers, keeping

Asphalt 8 is an excellent racing game, but it's better with a keyboard than a touchscreen

Tiny Troopers works fine using touch and is a lot of fun. Tap instead of clicking the mouse

Cut The Rope is perfect as a touch-enabled game, because the actions are so simple

journalists safe, destroying all enemy buildings and so on. The instructions tell you to left- or right-click, but tapping and two-finger tapping works too if you have a touchscreen. This is an excellent game with nice graphics and animation. It's more cartoon action than real action, which makes it even more entertaining.

Some games are just plain weird with a PC or laptop, such as *Asphalt 8: Airborne*. It's an excellent game, but the touch interface is really designed for a tablet, where you can grip the left and right edge with your hands and use your thumbs to press controls on the left and right sides of the screen. It doesn't really feel right gripping a 23" monitor by the edges with arms stretched out or even a 15" laptop. It works, but it just isn't natural. There are other control options, including the keyboard, though, and it's well worth downloading if you have Windows 8. **mm**

Too Much Hacking

David Hayward grows a beard and goes to live in a cave

I was reading an article the other day regarding some extreme hacks, and it got me thinking about how much we, as a society, rely on technology and how easy it is for that technology to be manipulated by others.

The more I thought about it, and the more I looked into various hacking methods and what kinds of devices and connected technologies can be hacked, the more I became paranoid about the world around me.

I looked at the phone sat innocently on my desk and considered that the camera could be activated remotely, without me ever knowing and that my every move could be observed. And how the microphone could similarly be activated and every word I utter could be monitored. How my browsing history is an open book to some, where I shop, what I buy, how much money I have in my account, what I did last weekend… the list goes on.

By the end of it, I was quite prepared to chuck every connected item in the bin and live as a bearded hermit in deepest, darkest Cumbria. However, I came to my senses. And had a shave.

While everything we own may be hackable, you have to consider that unless you're a celebrity posting naughty pictures of yourself or a politician with something to hide, then the chances of you being the subject of a full-blown technology hack are fairly slim. But it's worth having the thought at the back of your mind as to just how vulnerable everyday devices really are.

> **"Stuxnet is credited as marking the beginning of the digital cold war"**

Cash Points

Problem: Cashpoints are one of the more famous hackable connected items of modern-day technology. Most of them run older, unpatched versions of an operating system; some even still have Windows XP installed. This makes them especially open to specialised hacks, which can include secret security codes to bypass the user front-end (not very secret codes, I might add) and infected USB sticks that will automatically run a sequence of executables upon insertion.

Once the hacker has access to the engineer door at the back, all they need to do is tell the machine which cassette to empty, and the dispense operation takes place. The result is like winning a fruit machine: the cash keeps on coming.

Solution: For the banks, shops and other establishments who rent or own a cashpoint, the solution is to keep the machine under a careful watch without compromising customer security. Also, there's the impossible task of keeping every machine and its operating system up to date and patched.

Will it work? Probably not. No matter what the security barriers are, inventive hackers will undoubtedly find a way around them in the end.

The Cloud

Problem: Cloud storage is a wonderful invention of modern times, an off-site storage facility where you can drop all manner of files, to be accessed by anyone who you give permission to anywhere in the world and from any connected device.

It's quite surprising to hear what non-technical people think cloud storage actually is. There are some imaginative answers if you Google them, but the overall point is that not many of them realise that a cloud is simply a group of computers held in a server room somewhere.

We all know that, of course, and with that knowledge comes the fact that pretty much any computer in existence can be hacked and its contents viewed by others. Take, for example, the infamous leaking of private photos from celebrities' phones. All those celebrities' accounts were hacked and their private photos copied for all the world to see.

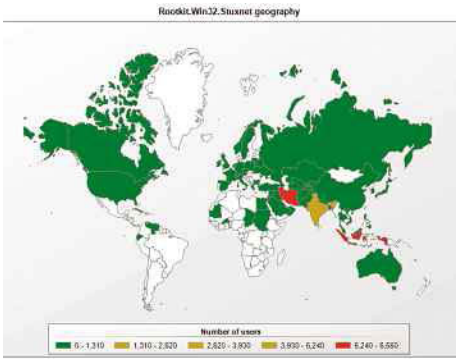
Do you trust cloud storage? Most of the time, it's fairly secure, but there are occasions when a set of passwords and accounts are compromised.

How To Protect Yourself?

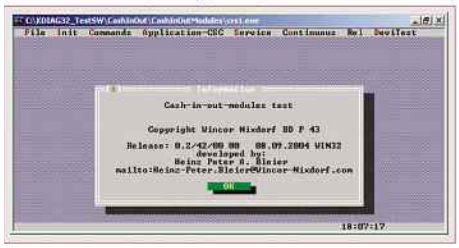
Unless you ditch every item of technology, there's not a huge amount you can do if someone 'really' wanted to gain access to your data. However, there are options available to help limit the impact a hacker has on you.

- Use a good VPN for browsing, like CyberGhost (**goo.gl/4LCkBV**).
- Don't bank from a mobile device.
- Read the small print on every installed app carefully.
- Avoid dodgy sites at all costs.
- Stay up to date with security patching and OS updates.
- Consider using a virtual image OS for browsing, a Linux OS designed for security.
- Use a sandbox installation environment.
- Don't upload naked pictures of yourself!
- Consider using a banking book instead of your debit card.
- Grow a beard, in preparation of hermit life.
- Turn off your router at night.
- Don't always be connected

Smartphones are hackable clients in your pockets



Scary Stuxnet marks the beginning of what's to come in the future



Apparently, it's quite easy to hack a cash point

Solution: You could create your own cloud, using a NAS setup. That way you're in control of the security. Alternatively, you could carry the information around with you on a USB stick or your phone perhaps.

Smartphones

Problem: Mobile security is one of the fastest growing industries in the technology world. Just recently there was a news report of a security flaw that left 600 million Samsung smartphones at risk of hacking. And, of course, there are countless stories of apps being able to access your camera, microphone, call list, contacts and other personal information. As an example, have you ever read the data policy for the Facebook app?

The amount of information we currently hold on a smartphone is quick shocking. Everything we do, everywhere we go and everyone we're in contact with is all accessible to those who know how to gain that information. Scary stuff, isn't it?

Solution: Maybe we shouldn't place so much information on a device that's constantly beaming out its location and telling the world "I'm over here!"

If we need to be in contact, perhaps an older device will do just as well? Or we could carry lots of 10p coins around with us for the dwindling number of phone boxes left.

Cyber Weapons

Problem: Stuxnet is credited as marking the beginning of the digital cold war. This malicious string of code was allegedly, according to the New York Times, created to wreak havoc on the Iranian nuclear facilities. The idea behind it, as far as we can tell, is that the code is transferred via bad USB sticks and infects systems by reporting good operation parameters while secretly causing damage to the hardware in the reactor.

There are naturally many theories regarding who created Stuxnet, but the finger of guilt mainly points to some agency of the US government. Whoever it was, they created one of the nastiest examples of cyber weapons in modern history – and Stuxnet is only the one we currently know about.

Solution: You may not see yourself as the potential victim of a cyber weapon, unless you put radioactive material out in your recycle bin. So how can something like this affect you?

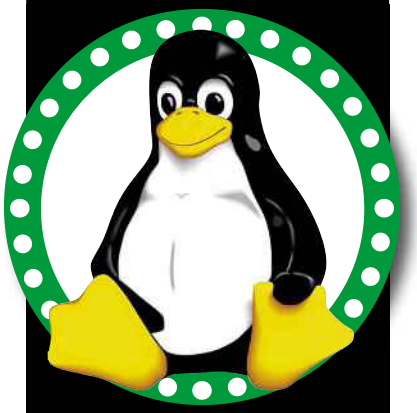
Cyber weapons are just the baseline for intrusion and eavesdropping hacks. If current theories are even slightly correct, then there's a good chance an unknown cyber weapon has already infected every connected computer OS in the world and is gathering information as we speak.

If that's true, then there's not much you can do other than totally disconnect and use a ZX Spectrum for word processing. That beard and hermit life in Cumbria is looking more appealing by the second.

It's All Too Much

It's enough to drive you insane, thinking of what may lie inside the billions of lines of code that continually whizz through the airwaves. However, let's take a moment to ease the paranoia and remember that unless you're someone who's viewed as being special, then most hackers aren't interested in you.

On the other hand, it's worth taking sensible precautions and keeping your data as private as possible. You know, just in case… **mm**



Do You Draw Attention To Yourself?

Will being too paranoid gain you unwanted attention?

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

A couple of weeks ago, I was looking into hacking and how individuals and governments go about such things. With all this talk of protecting yourselves against the prying eyes of the one world order or whoever, using some clever techniques such as a VPN under Linux, LPS Linux or even the likes of Tails, does this make you an instant target?

An old saying springs to mind: if you look like you you're trying to hide something, then people are going to start looking at you. In this case by using one of the many super secure methods to protect yourself and encrypt everything that goes out of your computer, will the likes of the NSA, MI5 and so on then start thinking that you may actually have something to hide and that you may be evil (by their definitions) – in which case they'll no doubt allocate you a satellite and start an investigation.

Fair enough, that may be extreme, but it does make you think. What if by protecting yourself to the nth degree, you're actually making yourself stand out like a digital sore thumb?

Be Secure, But Savvy

What's the alternative? Well, let's assume a compromise. On one hand, we have to make sure that our data is secure, and by data I mean the important stuff like bank details, names, addresses, telephone numbers, date of birth – the usual stuff that a nasty individual could use as some kind of identity theft.

To best protect the important stuff, we could use the likes of Tails, Tor, CyberGhost or LPS, maybe as a virtual environment inside VirtualBox on our standard Linux machines. Then for the not so important stuff, like having a rant at me on Twitter or a forum, we could simply use the normal Linux environment we use day to day.

The reasons for my thinking regard a recent article I read on one of the many conspiracy sites I frequent during the twilight hours. In here, it's claimed that the NSA will pay special attention to your data if it's encrypted, with the tag line 'You could be up to no good'.

It went on to say that the NSA will happily delete any domestic data once they've shifted through it and regarded it as harmless, but they'll make a point of keeping the encrypted stuff for scrutiny. One particular item that someone found in the NSA rulebook piqued my interest:

"In the context of a cryptanalytic effort, maintenance of technical databases requires retention of all communications that are enciphered or reasonably believed to contain secret meaning and sufficient duration may consist of any period of time during which encrypted material is subject to or of use in cryptanalysis."

Apparently, this was from a leaked NSA document from the now infamous Edward Snowden, so how much faith you put in it is purely up to you, but in many ways it does make sense.

So what's the moral of this week's Linux News? Protect yourself, but maybe not too much.

If you're using encryption, then the chances are they're watching you. Maybe...

New Releases (And More...)

More from the Amiga part of the market with Sven Harvey

Wings Battlefield

A new release from Cherry Darling, *Wings Battlefield* is a multiplayer game that is very much inspired by Cinemaware's *Wings*. You pilot a World War 2 fighter aircraft in four-player air battles, in local split-screen, across a local area network or against CPU players. The game disc includes versions for AmigaOS 4.x (either Warp3D or compositing version), MorphOS, AROS x86 and even Windows.

The game features procedurally generated landscapes across three landscape styles (all customisable),and various graphical settings, and support for all types and orientations of screen modes (including portrait monitors).

You can find out more about the game over at **www.cherry-darling.net**, and it's already available to purchase at AmigaKit – **www.amigakit.co.uk**.

MorphOS

Development of MorphOS, which in a roundabout way is based on work done to provide extra features to AmigaOS 3.1/3.5 machines with PowerPC processors (including building on MUI and Warp3D), has reached a new release in the form of the stability and security update that is MorphOS 3.9. Also available alongside the release is the appropriate software development kit. You can find out more about the update from the release notes and more about the OS itself over at **morphos-team.net**.

DVPlayer

In its quest to seemingly ensure a full suite of software is available for AmigaOS, A-Eon Technology has acquired the full development rights to the software from its author, Stephen Fellner, having been the application's exclusive distributor for the last year.

DVPlayer is a multi-codec audio and video playback program, which includes support for VideoCD, DVD and many file formats. The program is currently undergoing testing of its new RadeonHD v2 driver, which will allow GPU accelerated playback. I personally hope that Blu-ray support isn't too far behind, once device drivers for Blu-ray drives are up and running.

In other news from A-Eon Technology, MultiViewerNG, the AmigaOS 4 datatype viewer has been released on AmiStore priced at £6, while new RadeonHD and Warp3D drivers are also available from the AmiStore (with a free update for previous purchasers).

A-Eon technology is at **www.a-eon.com**.

Quake II

HunoPPC has released a HD port of the open source *Quake II* for AmigaOS 4 machines and supporting the Warp 3D system running on a Radeon HD graphics card.

You can download the game code at **hunoppc.amiga-projects.net**. You might also want to have a look at other ports on the site which include *Star Trek: Voyager Elite Force*, *Abuse*, *Fade To Black* and the unofficial *Turrican* remake, *Hurrican*.

Insert Disk 2

This new Amiga audio album is hitting the streets as I write, featuring remixes of Amiga music from Martin 'Instant Remedy' Noriander. Expect a review in an up and coming Amiga Mart, but it's currently available from Amazon UK and should be arriving at AmigaKit soon.

Commodore: The Amiga Years

The Kickstarter campaign for Brian Bagnall's follow-up to *Commodore: A Company on the Edge* is now live at **goo.gl/CIdEz3** (also linked at the Amiga Mart Facebook page!)

Event Updates

The USA's 30th anniversary event, taking place at the end of July, has just announced that the premiere of the Kickstarter funded Viva Amiga film will be at its event, and there's due to also be a showing at the UK's 30th anniversary event at the beginning of August.

The USA event has also announced that Ron Nicholson and Joe Decuir, who worked on the original Amiga Lorraine chipset (which became the OCS or Original ChipSet in the original Commodore Amiga), will be presenting some of their work at the event.

Find out more about the UK event at **www.amiga30.co.uk** the USA event at **www.amiga30.com**, and there's an event in Amsterdam whose site is at **www.amiga30.eu**.

Various smaller events are taking place too, and a non-exhaustive list is being maintained at **goo.gl/TVeHLL**.

Sven Harvey has been our Amiga specialist for over 14 years, drawing on his 23 years of retailing computer and video games and even longer writing about them.

5 Still Alive?

Ian McGurren considers an overlooked contender for the budget crown

Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Mobile Mart is a fan of second-hand mobile phones. They offer great value for money and are much kinder to the world we live in than throwing an old one away and manufacturing a new one. Of course, not all second-hand phones are equal, especially those that were a bit rubbish in the first place – the Android market is littered with those. Buy an Apple phone second-hand, though, and you'll always get a one-time flagship device, albeit one with a few years on the clock. But can they still prove useful?

After refusing to move with the market's penchant for larger screens, Apple finally capitulated in 2012 and gave the 3.5" screen a bump to a more acceptable 4", and it's here that the iPhone 5 comes into the picture as the Apple device with the smallest acceptable screen for the modern age. At between £100 and £150 on a good day, it's also the best value for an iOS phone.

Along with the 4" 1136 x 640 'Retina' screen, the 5 has an A6 CPU, 1GB RAM, 16-64GB non-expandable storage and the later Lightning-style connector, all in either black (not Space Grey) or white. It came with iOS 6 but is compatible with the current iOS 8.3 and will be compatible with the forthcoming iOS 9. It also works with the Apple Watch.

While it was quite the star when released, the iPhone 5 isn't quite the knockout it once was, even in the iOS world, having now roundly been usurped by the iPhones 6 and 6 Plus. Against contemporary devices, they look a little of-their-time, with a 4" display now considered quite small, more often found on budget handsets.

But even with this in mind, the iPhone 5 is still a very good device and for the money will rival or beat a modern device with a similar price. Firstly, it runs the latest version of iOS, version 8.3, and it runs it pretty well too, unlike the iPhone 4S, iPad 2 and iPad mini. If you want the latest iOS in your hand, running well and with little expense, the 5 is your first stop, no question. Other Android devices from 2012 may not even have Lollipop from their manufacturer, let alone run it as competently as iOS 8.3 does here. Even those that do may never see Android M without a bit of ROM flashing.

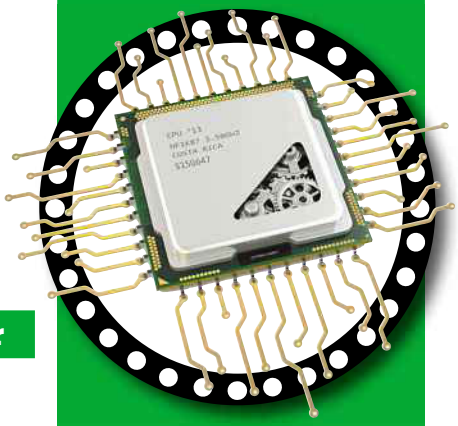
The iPhone 5's camera is still excellent too, churning out far better images than budget devices in the same price range. The same applies to its audio capabilities too – there's still an iPod in there, don't forget, and it still sounds great.

There are, however, plenty of ways the 5 hasn't kept up, and that can be a little embarrassing. The screen, while superb to view, is small and isn't even 720p HD. No NFC means no payments, so even Apple Pay won't work if you don't have an Apple Watch. Bluetooth is still hobbled too, and battery life tends to struggle a little some three years down the line (though some are covered by Apple for a replacement – worth checking). Finding a pristine one is also unlikely, given the anodised coating's propensity for easy marking and chipping. And no, there's no sniff of USB or expandable storage, though that's the case with any current iOS device too.

However, there's still a growing market for smaller, yet powerful 'compact' handsets, and the iPhone 5 fits right into this category. It's great in the hand, very capable, takes great pics and runs the latest OS. In fact, it's still so capable of these tasks that Apple still sells it, albeit with a more colourful shell, under the guise of the iPhone 5C, meaning the 5 is likely to see iOS 10 (X?) as well. For the money, the iPhone 5 could well be one of the best budget smartphone buys today.

Laptop Life Extender

Andrew Unsworth argues that upgrading what you have is better for the environment and your wallet



I love new technology but can't help feeling guilty about throwing away or wasting old tech that I have lying around. That's why much of it gets recycled. Other times I'll upgrade computers and use the older components I've swapped out in some other machine or for some other purpose. It's for this reason that when my wife's laptop started suffering from performance problems, which had slowed it down to curse-inducing levels, I decided enough was enough and ordered a shiny new SSD to speed things up. Once the SSD is safely ensconced in the laptop, I'll format the old drive and drop it in a HDD enclosure; just because it's too slow for use as a system drive, it doesn't mean it won't be good enough for use a general-purpose external drive. I'll be installing some new RAM too, and the old SO-DIMM should find a new home in another laptop.

The result of all these upgrades will be a laptop with 16GB of memory and a 500GB SSD. Given that it's an old laptop, some people might say why bother? Instead of wasting money on it, why not buy a new laptop? Even though it has a Sandy Bridge CPU, the overall quality of the laptop and the performance increase the new upgrades will give it means that it'll be a higher spec laptop than I could buy for the £232 it cost me to buy the SSD and RAM. These two upgrades should keep it going for a few more years, and in this age of austerity and with a pressing need to preserve the environment, it doesn't make sense to throw away an otherwise perfectly good laptop.

> **"It doesn't make sense to throw away an otherwise perfectly good laptop"**

Indeed, when I look at what I can buy for the roughly the same amount I'll be spending it's clear that I won't get something as good, All the laptops are either Chromebooks (there's nothing wrong with a Chromebook, but it isn't what's needed in this instance) or very basic Windows-based laptops with 2GB of RAM and much smaller mechanical disks. It doesn't make sense to buy a new laptop when you consider the performance advantage of upgrading what I already have.

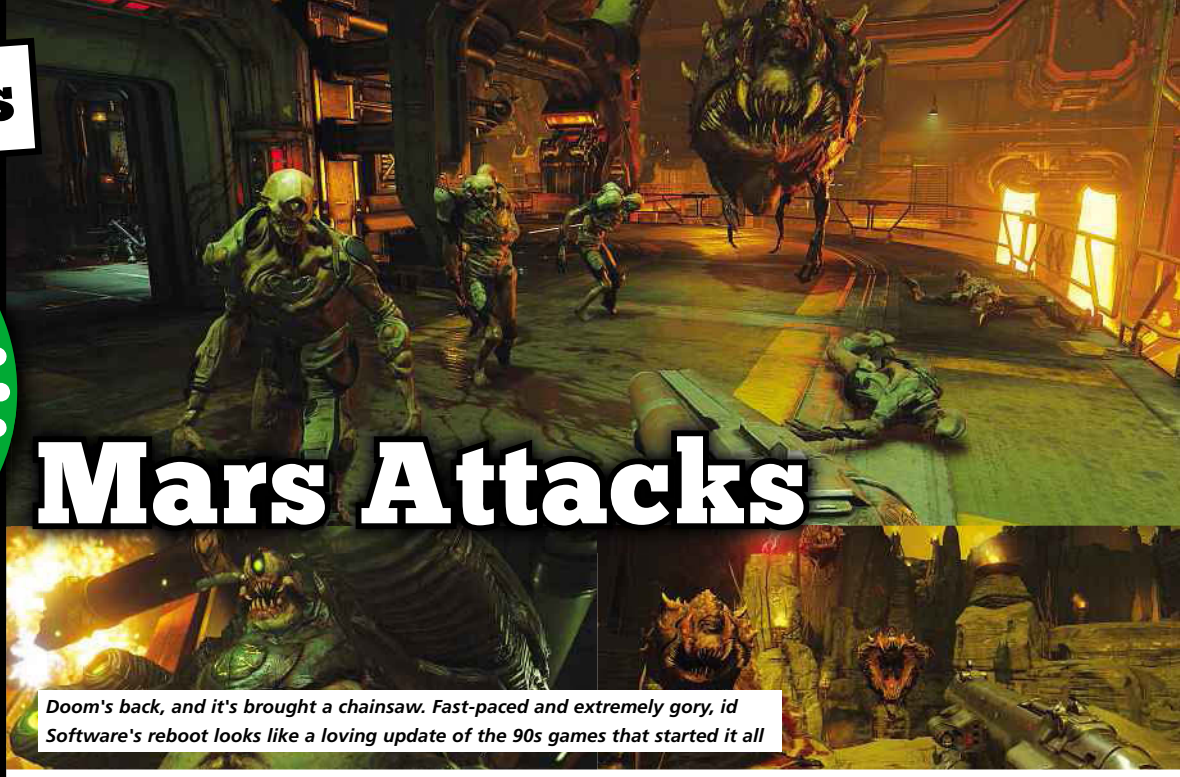
Of course, all this assumes that I'll have no trouble fitting the components and they'll both be compatible, but the only foreseeable difficulty I have is cloning the operating system, mostly because I no longer have a SATA-to-USB convertor, so I'll have to fork out for one. The SSD comes with its own disk cloning software, so I'm hoping that I can migrate the OS and data to the new drive without a hitch.

We all love buying and using new tech, but if you're thinking of buying a new laptop or PC just because one or two components are showing their age, it may be cheaper and greener to upgrade instead.

An SSD can give an old laptop a great performance boost

Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*



Mars Attacks

Doom's back, and it's brought a chainsaw. Fast-paced and extremely gory, id Software's reboot looks like a loving update of the 90s games that started it all

This week, Ryan checks out the first footage from id's Doom reboot, and takes a look at how EA Dice's Star Wars: Battlefront is shaping up...

Plug & Play

When id Software showed off brand new *Doom* footage at E3, the on-screen ultra-violence was accompanied by ghostly shrieks and howls – not from the scores of demons being blown up and gunned down, but from the enthusiastic expo crowd.

With its big reveal, id managed to hit a sweet spot between nostalgia and modernity; the familiar swish of a door opening harked back to the *Doom* of old, while the detailed surfaces and great showers of high-def gore give the shooter a current-gen sheen. Make no mistake, though, id's new offering is very much in the spirit of the genre-defining 90s series: enemies attack in great hordes, player movement is fast and smooth, while the familiar range of weaponry also makes a reappearance – shotguns, chainsaws and the BFG9000 are all present and correct. Exploding red barrels add to the retro vibe, and, while the showers of glowing items that erupt from defeated enemies is a new touch, help give the new *Doom* an arcade-like feel.

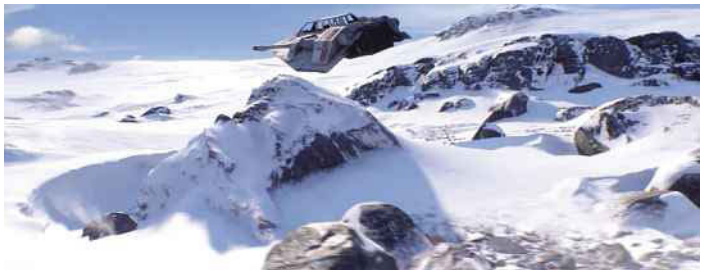
The backstory's about as basic and unreconstructed as the game's absurdly gory action; you play a space marine on Mars, where wave after wave of fleshy demons are emerging from a gateway to hell. Once again, it's your job to cut the demons down to size and kick the infernal door shut. The greater proportion of id's gameplay demo showed off a claustrophobic interior map, all long corridors and low ceilings, but the studio also took the time to give us a glimpse of what one of the more expansive, exterior stages look like. Here, yet more strains of raging demon roam the Martian landscape, including a humongous, waddling boss – possibly a variation on the Mancubus from the earlier games – which soaks up bullets like a sponge. A copious dowsing from a plasma rifle eventually brings the beast low, at which point the player closes in for a grim finishing move - he (or she) rips its heart out and stuffs it down its gaping maw.

Doom, then, isn't the most subtle game seen in E3's halls but – with, its frenetic shooting and an intense-looking multiplayer mode, full mod support and a map sharing system called SnapMap – it could mark an exciting new start for the series that defined the modern FPS. We'll know come spring 2016.

Shenmue Returns

One of the big surprises at this year's E3, *Shenmue III* was launched to a stampede of enthusiasm on Kickstarter. The Japanese RPG series, which began in 1999 on Sega's ill-fated Dreamcast, have gone on to cult status, and with Yu Suzuki back in the role of director, the series is now coming to PC and PlayStation 4. Garnering more than $3m in pledges within just five days of its launch, the *Shenmue III* campaign is likely to be among the biggest in Kickstarter's history by the time it ends. But the launch hasn't been without its controversy; Sony has revealed that it's a "partner" in *Shenmue III*'s production. Which begs the question, why isn't Sony footing the full bill itself?

➤ Yu Suzuki's returning to direct a belated entry in the much-loved Shenmue series. On Kickstarter, the game's already amassed a staggering $3m at the time of writing



EA Dice showed off Star Wars: Battlefront at E3, with the 40-player match among the icy mountains of Hoth being the most impressive moment

Online

Star Wars: Battlefront is among EA's biggest games on the horizon this year, and promotion for the game has thus far focused on crowd-pleasing detail: the precisely reproduced scout walkers and Stormtrooper suits, the meticulously recreated sounds of blasters. What's been missing, at least until now, is a proper look at what the game will look like when it's up and running. That all changed at E3, when EA Dice finally gave us a look at a some footage of an unfolding multiplayer battle.

First came a Rebels-versus-Empire skirmish on the planet Hoth. Like the famous early sequence in *The Empire Strikes Back*, the Empire's AT-AT Walkers are assaulting the Rebels' base, while the Rebels fight back with ground forces and Snowspeeders. The five-minute demonstration packs in a brief look at how each vehicle looks and handles. You can clamber into the driving seat of an AT-AT or an AT-ST, take to the skies in a TIE fighter or Snowspeeder, or join the ground war with a blaster and jetpack.

EA's demo of a 40-player match on Hoth was joined by a look at a co-op Survival mode. As the name implies, this pits two players against multiple waves of AI forces – in this instance, the Rebels are fighting off an Empire assault on Tatooine. Once again, EA pack in as many grin-inducing nods to the *Star Wars* movies as they can; hapless Stormtroopers are easily picked off with a blaster shot to the head, but then the scout walkers start to totter onto the map and TIE roar in overhead. To even things up a bit, the Jetpack gives players a boost of power into the air - all the better to deliver shots to a towering scout walker – while shields give a brief yet handy bubble of protection from enemy fire.

It all looks like fun, and the level of detail EA Dice has invested in the models and backgrounds really is impressive. The question, of course, is whether the game has enough longevity to keep players interested once the initial thrill of seeing familiar characters and locations begins to pall. Aside from the multiplayer and co-op battles EA showed off, it also has two further co-op modes planned; there are Trials, which are story-focused, and Battles, which place players in the centre of a larger, AI-controlled conflict. With a relatively slim selection of 12 multiplayer maps at launch, will *Star Wars: Battlefront* do enough to match the sheer variety of the earlier games in the series? Only time will tell, but the game's promise to let *Star Wars* fans "live out their fantasies" will more than likely prove difficult to resist.

Star Wars: Battlefront is out on 20th November.

Incoming

As we've already established in earlier editions of Gaming Weekly, Frictional Games' forthcoming *Soma* looks absolutely terrifying. If, for some reason, you'd managed to avoid its forthcoming bout of survival horror, Frictional released a new trailer (**youtu.be/4MN8gw6S4kM**) to coincide with E3. Like *BioShock* (or maybe the largely forgotten 1989 schlock-horror movie, *Leviathan*), *Soma* takes place in a research facility lying on the ocean floor. The electricity's not working properly, and something mechanical and very aggressive seems to have taken over the entire place. Exactly what's going on down there is obviously up to us to discover for ourselves, but given that Frictional's the studio behind games like *Amnesia: A Machine For Pigs*, we should be in for a wild and nasty ride. *Soma*'s out on 22nd September.

Something terrifying has taken over a science facility at the bottom of the ocean in Soma. This is the new game from the maker of the Amnesia games, so gird your loins...

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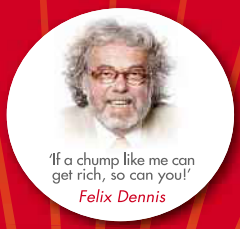

THE CRITICS

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Mail on Sunday

'Well-founded advice based on hard-won experience'
Financial Times

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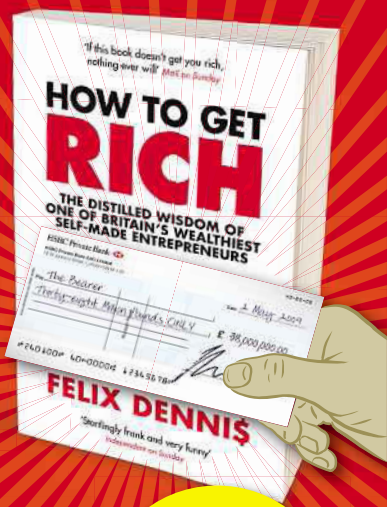

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Write the wording for your advert in the numbered boxes below (one word each box). Maximum 30 words free.
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16	17	18	19	20
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30 Words FREE Private Ads Only (Trade ads MUST be boxed or reversed)	Boxed		Reversed	
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	£6.80	£13.60	£8.00	£16.00
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£6.80	£13.60	£27.20	£14.80	£29.60
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Choose a category you would like your advert to appear in and tick the box.

- ☐ Hardware for sale
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Step 3

Complete all fields of your personal details and payment method.

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If I have more than 30 words, I have enclosed due payment. I am not advertising pirated, pornographic or any other kind of illegal software and my advert is both honest and legitimate. MM reserves the right to refuse or alter adverts at the discretion of the management. MM cannot be held responsible for the condition or quality of goods advertised. Your advert will be processed on receipt and will appear a.s.a.p. subject to space and availability.

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Authorise payment for £

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Desktop PC. Zalman T3 case, 3.4Ghz CPU, Asus Motherboard, Seagate 500gb HDD, Samsung Optical drive. 4gb Kingston RAM Wifi & Ethernet,Genuine Windows 7 Ultimate. Collection preferred from Flintshire or willing to discuss options. £150.
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Email n-peckdd@5kid5.net

27" iMac. 2.9 GHz Intel i5, 1TB HDD, 8GB RAM – late 2012 Model (thin edge) iMac in good condition, running OSX Yosemite. No keyboard or mouse. Supplied in original box. £700.
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Email: ChrisSalter@hoarelea.com

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Email: davethomas96@aol.com

Laptop for sale. HP NC 6400 Core 2 DUO 2.0MHz 3GB ram 80GB HDD, DVDCDRW Fingerprint reader, Fantastic and fast . Windows 7 32-bit professional. Only £60 plus £12 for next day delivery.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Asus Z97 Gryphon Armor Kit. Steel backplate with plastic top and auxilliary fan. Also some minor plastic bits. £20. Email for more details.
Email: graham_rocknell@yahoo.co.uk

Laptop for sale. HP Compaq 6910p Core 2 DUO T7300 2.0mhz 3gb ram 80gb hard drive DVDCDRW Fingerprint reader fantastic and fast , Genuine win 7 35 bit professional Only £60 plus £12 for next day delivery. Fantastic condition, very fast. Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

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E-mail: scobieg09@gmail.com
WD 3TB internal Hard Drive. Excellent Condition, £65 inc P&P.
Tel: Michael Cunnane (01452) 303732

WD Internal SATA 3.5" 2TB Hard Drive. Excellent Condition. £37.50 included P&P. Flat screen monitors. Mainly 15" £20+p&p and 17" £30+p&p but have others on request. When packing I will make sure they have lot of padding to reduce rick of damage. Please email or call me for more information.
Tel: David (01616) 888119
Email: pcmadnessltd@yahoo.co.uk

IBM Thinkpad T30 laptop for spares or repairs. Excellent condition, but does not bootup. Not sure why. Could be an easy fix or for parts/spares. £15 plus P&P.
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Webcam (Trust Spacecam). Boxed with CD of installation software and instruction manual. Perfect condition. £10.
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E-mail: scobieg09@gmail.com

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Email: david@ewles.gb.com

Toshiba Portage i5 laptop. 2.5GHz Model R830-13c 4GB RAM, 320GB HDD. Wi-Fi, fingerprint scanner, HDMI ouput. Sold on eBay for over £200; only £150 plus £15 p&p. Bargain. Great condition. Very light.
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Email: davethomas96@aol.com

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Email: gw7hav@googlemail.com

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4x 1 GB DDR2 RAM (Ocz Nvidia SLI PC2 6400 epp 4-4-4-15) for Sale. £40.00 for all 4 + Post/ Packing. In perfect working order.
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Laptop Hard Disk Drive. Fujitsu. 20GB. Excellent condition: £10.00.
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Corsair Vengence 16GB (2x 8GB) DDR3 Memory CMSX16GX3M2A1600C10. Never used but box opened. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85.00 inc. postage to the UK.
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HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated & updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/COAs. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/Islands. Payment by Cheque OK subject to clearing, Paypal at £25 additional (to cover their fees). *Tel: (07794) 528857*
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Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

Kingston HyperX 2x2GB DDR2 1066MHz RAM. Tested and removed from a working environment. £45 inc Free Courier. Payment via PayPal.
Email: info@jmcomputing.info

2x 512MB PC3200 DDR400. Two sticks were removed from working system. £5, plus £1 P&P.
Tel: Alan (02084) 202322
Email: alan@asandco.co.uk

DDR2 memory sale. 2 x Nanua PC2 3700 256MB £6 pair, 2 x HP PC2 4200 256MB £7 pair, 4 x HP PC2 4200 512MB £10 pair or £18 for four.
Tel: Jeremy Gill (02089) 430683
Email: arthur.pewty1@virgin.net

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Addon Wireless LAN USB 2.0 54Mbps 802.11g Adaptor. Boxed w/ manual and software: £9.
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CD Stomper CD/DVD Labelling System: Software, Labels and Label Applicator. Boxed. Unused. £9.
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Tel: Gordon (01314) 660205
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DIR-615 Wireless N Router. Boxed, brand new. £30.
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2x 120GB Maxtor DiamondPlus 9 Drives plus 1x 80GB DiamondPlus 10. Can be supplied with 2x plug-in caddies. Reasonable offers please.
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WD 2TB desktop HDD. Formatted ready for an OS. Runs very nicely. New laptop means desktop items must go! £40 inc. tracked postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba C500D-B-11 laptop. Almost new cost £279 will accept *£150ono*
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Intel 3930K processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
Tel: Tim (01623) 624509
Email tim.stirland@btinternet.com.

Amstrad PcW 9256 in good working order with software. Offers.
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

Asus P8Z68-v LX socket 1155 motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3-1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
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Email: jmbest2@sky.com

ASUS P5B Motherboard - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £35 inc Free Courier. Payment via PayPal.
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SAMSUNG GALAXY Tab 3 for sale. 2mths old, 8GB, wi-fi, £80 open to offers. Willing to post at a charge.
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SoundBlaster Audigy SE 7.1 soundcard for sale. Perfect working order but not needed any more. Just £12 plus postage.
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Email: ianmatthewuk@yahoo.co.uk

Asus p8h61-mle motherboard socket 1155. Original box 1/0 cover driver disk manual together with Celeron 91620 dual core CPU and 4 9195 pc1300 memory. Working fine. No fan. £70 + free postage.
Tel: (01619) 501218
Email: jmbest2@sky.com

Toshiba Satellite SA60 laptop. Model PSA60E-092058EN. Windows XP Home Edition with Certificate of Authenticity. For spares or repair - broken power connector on mobo. No power cord. Otherwise in very good condition. £40.00 + p&p
Tel: Peter Scarth (01452) 372350
Email: pscarth@blueyonder.co.uk

Apple Touch 32 GB iPod. Virtually new cost £199 will accept £100 O.N.O
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400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

Panasonic KX-P7105 mono laser duplex printer. Some toner left. Up to XP only – hence £25. Buyer will need to collect from N2, East Finchley
Tel: (02083) 431527
Email: pnnikiel@gmail.com

Amstrad PcW 9256 in good working condition w/ software. Make an offer...
Tel: John Adams (02088) 641202
Email: meeching@uwclub.net

GEFORCE 1GBYTE 24- PCI express PC card. HDMI DVI VGA PC video card. £10 plus p&p £4.50. 2 for sale. £10 each.
Tel: (01707) 339063
Email: awhishaw@aol.com

HP 4GB memory Microserver with two hard disc drives. £110. One with Linux MINT. Other with Linux FreeNAS. This will also run Windows 7 and Windows Server or Home Server. (Win 8 I've not tried it) Two spare HD slots with appropriate caddies. Slot for your SATA DVD drive also, (or use external usb or DVD drive if needed. four usb sockets on front, two on rear. VGA, network, power sockets on rear. Supplied in original HP box with CD and leaflets etc. Collect from Harrogate, North Yorks, or posted via Hermes for £12 (or less if I can do it cheaper). Cash on inspection and collection (Highlands and Islands might obviously cost more to be delivered).
Tel: (01423) 872045
Email: it_central@ntlworld.com

400GB IDE drive 3.5 inch formatted ready for use. Only £20 plus £3 for p&p. I can load genuine XP Professional from Microsoft with genuine certificate of authenticity for an extra £10. Refurbished.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
Email: davethomas96@aol.com

EPSON PRINTERS T715 12 multipack F.O.C. to good home, just pay postage £2.50. (Tesco equivalent original cartridges £120 current special offer!) Perfect crisp printing etc.
Tel: Pete Dew: (07526) 988594

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Tel: Pete Dew (07526) 988594

Apple Mac G4 Tower. 400MHZ CPU, 640MB RAM, 2xHardDrive (40&20GB). DVD & ZIP. OSX v10.3 Panther+OS9. NO KEYBOARD OR MOUSE. £25 ono Buyer collects
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HARDWARE WANTED

Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?

WANTED: Fractal Design Define XL full tower case. R1 (original version) in black.
Tel: (01670) 860146
Email: mm@tectron.co.uk

WANTED: Working Dot Matrix Printer in Good Condition. Thanks!
Email: printer.20.odaily@spamgourmet.com

WANTED: Acorn computer either an A5000 or A7000. Also book on teaching yourself binary.
Tel: (07817) 861011
Email: Johnhaviland73@gmail.com

SOFTWARE FOR SALE

Do you have old software that you simply don't use? Why not advertise with us and see if anyone else can make use of it – you may well be surprised to find that someone is looking for it!

Adobe Photoshop Elements and Premiere Elements 12 Full Version - Windows/Mac. Original Boxed CD with unused product key. £47.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

PCB design software 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99
Tel: Nigel Wright (07967) 527693
Email: cresswellavenue@talktalk.net

Cyberlink PowerDVD 12 Standard. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Microsoft Office 2013. Original Software only £100.
Tel: Gordon (01314) 660205
E-mail: scobieg09@gmail.com

Windows 7 Ultimate 32-bit version. NEW software and license (certificate of authenticity) 100% genuine and unopened software .ONLY £45 including P&P.
Tel: Dave Thomas (07828) 982930 or (01942) 706571
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Email: a2345@btinternet.com

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.
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Email: a2345@btinternet.com

Norton Family Premier 2.0.: Windows 8, 7, Vista or XP, Original Symantec unused product key £15.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Microsoft Office 97 Professional. Original disc with key £18 inc postage.
Tel: Andrew (01376) 512118

SOFTWARE WANTED

Wanted: I have a BCL 2.4g Wirless Gaming Mouse, Model: RF0P77 (3v 7ma) but no Drivers. Can someone help with a copy of the Original Drivers for this Wireless Mouse please?!?
Email: Cliff Evans
cliffordevans603@btinternet.com

Wanted: Driver disc for Toshiba L30-11D PSL33E laptop. Laptop useless without drivers but only worth £40, so cannot pay a lot.
Tel: John Udall (01384) 824494
Email: john.udall@blueyonder.co.uk

Wanted: Windows XP SP2 or Windows 7. Also a boot disc for Toshiba satellite L40-18Z.
Tel: Mr Cranney (07948) 927384
Email: mcrnny1932@gmail. com

Wanted: Windows 98 CD ROM with boot disk instruction manual and serial number. included.
Tel: Craig (07867) 930265 or (0191) 2093677
Email: craigtin44@hotmail.com

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London
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Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

AC/Disconnect

In reference to Lee's filter problem in issue 1366. If the line is testing okay by the service provider and no fault is apparent within the property, then Lee may be suffering from an AC balance problem. A line test will not usually pick this problem up, but the customer will experience loss of sync and slow speeds. AC balance is measured in dB and it is the ability that a copper pair has to resist an induced signal which would affect ADSL service.

If Lee is reasonably close to the exchange then his AC balance should be okay. Anything under 50dB and he'll have a problem that should fail any tests an engineer carries out on the line. Anything greater than 60dB is a good AC balance figure and will not be affecting the broadband service. Something as simple as a high resistance joint on a copper pair can badly affect the AC balance. An engineer can use his test set to do a Time Domain Reflectometer (TDR) test to locate a HR fault. It'll appear as a peak on the line trace, which will give a distance to the fault. If the AC balance is really poor you'll hear it as noise on the line while using the phone, so it should be checked if the line clear?

Also, you cannot usually plug a modem directly into a phone socket. The socket on an NTE will not accept the RJ11 cable from the router without some form of adaptor. Hope that helps Lee out.

"AC balance is measured in dB and is the ability that a copper pair has to resist an induced signal, which would affect ADSL service"

Neil

That's a very detailed suggestion, Neil, and it's certainly something that could be looked into by anyone having issues with their broadband connection similar to those expressed by Lee. It may be worth asking an engineer about this, and ask them to check it all out, especially as it's often overlooked.

I'm certainly aware that an adaptor is needed for many modem connections to the wall socket, and even if this isn't always the case, it's important to clarify this, as you may need to use an adaptor. Thanks for pointing that out, too. Interestingly, 've also had more suggestions for Lee's issue...

Not all line faults are easy to detect, and some can be easily missed

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Hardware Filter

I must be a sucker for punishment as I still run an Intel 6700 CPU on a Gigabyte GA-965P-DS4 motherboard. It is working at full stretch all the time, as I host BOINC.

Sometime after upgrading to fibre and enjoying upload speeds of around 70Mb/s, the connection started degrading, and I was sometimes down to 15Mb/s or less. Plusnet could find nothing wrong with the line, and the Openreach engineer could find no problems. Could it be the router? I changed that, still no good. It turns out that the motherboard was slowly dying and the onboard LAN was giving up. Fitting a PCI LAN card solved the problem, back to 70Mb/s.

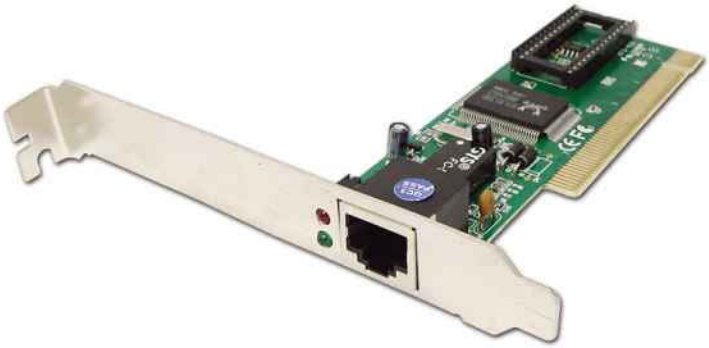
By the way, the SATA controller is now giving problems. Luckily, the board has two separate ones, and moving the two hard drives to the other sockets has sorted that problem, at least for now. I suppose that I will have to shell out for a new bundle soon, though!

Mike Harrison

Mike raises a very good point here, as it's often very easy to ignore the PC itself when you're having issues with broadband speed or connectivity. You may always initially point your finger at the ISP, but this can sometimes be incorrect, and it wise to always check your PC too, just in case you have any hardware issues causing your problem.

If the same broadband issue affects multiple devices, though, it's much more likely that the trouble lies with the ISP and the line than anything specific to your computer hardware – and you should make sure to inform the technical support you're dealing with of this fact, so you can eliminate your own computer hardware from the situation and focus attention on more relevant areas.

Some broadband issues my be PC hardware related, so don't instantly blame your line or ISP



Set Top HDD

This is not computer related as such, but maybe of interest to your readers I have a digital TV recorder that has a HDD. Of late, recordings have be jumping on playback and subtitles don't appear sometimes (I need these as I have hearing problems). The disk is old and needs replacing and is an IDE type.

I was wondering whether it would be possible to replace it with a SSD? A computer shop told me no, but I see you can get IDE to SATA mini board conversion (which I have ordered from China at £2.48!). I was hoping the faster speed may help the subtitle issue as this is a problem with a lot of these boxes even when new. I would appreciate your views on this and also regarding longevity of an SSD used daily in this way.

Eric

I don't know what your model of TV recorder is, so it's hard to say if your device can have its hard disk replaced, upgraded, or switched with an SSD. In many cases, this probably isn't possible, as the firmware of the recorder may not actually support another model of HDD, let alone SSD, regardless of the connector or adaptor used. The only way to check for sure without possibly wasting money would be to contact the hardware manufacturer directly.

Assuming you have a device that can be upgraded in this way, you'll still often be limited to specific brands or models of hard disk. Other devices that do allow hard disk replacement, such as consoles like the Xbox One and PS4 are not compatible with some hard disks, even when the manufacturer freely allows such upgrades. This also needs to be taken into account.

Solid state disks have come a long way since the first generation issues, but they're still expensive on a per-GB basis when compared to HDD models, so it'll cost a lot more money if you're looking for a lot of space. If this is an issue, I'd say stick to standard HDD units. If you can afford it, however, SSD may help a little – but whether or not it'll help with subtitle issues is debatable, as the unit itself could be more to blame rather than the storage media.

Some TV recorders can be upgraded, but you should check with the hardware manufacturer before you shell out for new parts

ASK JASON

Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
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30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

In Another Galaxy

I own a Galaxy Note 3 phablet – I've had it for about a year. For some reason, it's stuck on Android 4.4.2 (KitKat), though I'm convinced I should be able to update it to Android 5.x (Lollipop). I keep trying the 'Software update' option in the settings but all I get is the following message: 'The latest updates have already been installed.' I'm with O2 but they were no help when I called them. Is the device broken in some way? Is there another setting I need to select?

Matt, Gmail

I've had three or four Note 3s pass my palms these last few weeks and not one has been offered the update to Lollipop. These have been on O2 or unlocked, and that's likely the problem. Each network rolls out updates on its own schedule, as it has to bolt on all that wretched bloatware and ensure it works. I think EE, 3, and Vodafone users have been licking their Lollipops for ages. Unlocked Note 3s have to get updates straight from Samsung, which is proving to be just as lackadaisical as O2.

It's ridiculous, really, isn't it, Matt? The Note 3 is merely a big, souped-up version of the older Galaxy S4, and Lollipop was rolled out on all examples of that some while ago. Why's there a delay with a newer, broadly similar handset? My guess is it's to do with the stylus – those special apps take time to be tweaked and checked, and of course the S4 doesn't have them. Even so, Samsung must already have done the tweaking and checking, as how else have EE, 3, and Vodafone joined the party?

I don't get it. As Toyah once sang, it's a mystery. At this rate some Note 3 owners will receive Lollipop just as other Note 3 users are receiving Marshmallow (or whatever sweet treat beginning with 'm' Google decides to call it). Have you tried Kies, Samsung's dreadful PC software? Is Lollipop available via that? Take a look – if you've got the stomach for it. Kies will make your blood run cold.

PS – Spare a thought for us poor Note II owners. There have been rumours since last year that we'll get Lollipop, but frankly I think they were started as a cruel joke and someone in a padded cell somewhere is cackling in mindless ecstasy.

Samsung Kies: even in Swedish it's a frightening prospect

Bundle Of Joy?

Here's another phone query, and O2 crops up again, too

A couple of weeks back I bought the Linx 7 tablet bundle from Tesco, the one that comes with a 'free' Nokia Lumia 530 smartphone. I like the tablet a lot and I think Windows 8.1 is great (perhaps I'm the only one!), and I've also signed up for the included Office 365 suite and OneDrive storage, but so far I've been unable to use the phone.

I understand Tesco Mobile runs on the O2 network, so I'd assumed my O2 SIM would work (I'm on a two-year contract). But the phone just asks me for an unlock code. The bundle only cost £59 – £89 minus £15 of doubled-up Clubcard vouchers – but the phone's no good to me if I can only use a Tesco SIM. What are my unlocking options?

Theresa, Yahoo!

*It's true that Tesco Mobile runs on the O2 network, and it's true that a phone locked to O2 will always work with a Tesco SIM (or a Giffgaff SIM). Sadly, however, the reverse isn't true: a phone locked to Tesco will normally *not* work with an O2 SIM (or a Giffgaff SIM).*

It's a bit of a gamble with Tesco. Some of its phone are locked, and some aren't, even when the boxes say they are. There's little rhyme or reason to it. Even so, I believe every one of the Lumia 530s sold in the Linx 7 bundle are locked good and proper. I can understand why. The bundle was probably a loss-leader and Tesco needs to claw money back from mobile charges in order to stave off even deeper financial woes (the mobile business is actually up for sale).

Unlocking a Tesco phone can sometimes be tricky – it depends on the model. Tesco- locked Moto E and Moto G handsets are usually a doddle, but Nokia Lumias typically aren't. You can't hop on eBay and buy a widely available 02 code – you need a Tesco-specific code.

Luckily, though, Theresa, Tesco will unlock any pay-as-you-go phone for free if it's more than a year old. And if it's newer than that, the charge is £10. I'd say that's pretty reasonable. Just give the technical support guys a bell on 0345 301445 and you'll soon be off and running again with your O2 contract.*

** Tesco's pay-monthly phones are generally free to unlock regardless of age. This is because users will still have to complete the contract even if they switch to another network, so Tesco can't lose. In fact, it can only win, as it'll receive income for minutes, text, and data it won't actually have to provide.*

< Windows tablets continue to drop in price, and with a full desktop OS and other incentives (including a free upgrade to Windows 10), they can offer remarkable value for money

Done And Busted

My old but trusty Dell Inspiron 1545 laptop has started to play up. It works well enough but the screen has some vertical bands down it – three or four of them starting about an inch from the left. The rest of the screen seems to work fine. Can the screen be replaced, and would it be worth the cost? Or do you think the problem's actually with the graphics hardware? The laptop's core specs are below.

- **CPU:** Pentium T4200 (2GHz, dual-core)
- **RAM:** 3GB
- **HDD:** 320GB
- **Display:** 15.6" (1,366 × 768)
- **Graphics:** GMA 4500MHD
- **OS:** Windows 7 Home Premium (64-bit)

George Moorcroft, Staffordshire

I doubt the graphics hardware's at fault, George. If it were, I'd expect the issues to be fairly random, affecting different areas of the screen every time you booted up. I'd also expect areas of incorrect rendering and other tell-tale artefacts. As you're seeing vertical bands always in the same places, I think there's damage to the connections around the screen's edge or maybe in the ribbon cable connecting the screen to the motherboard. Such faults aren't uncommon, especially as laptops get old.

Is the screen worth replacing? Well, fully working, an Inspiron 1545 with specs like yours would sell for up to £100 (on eBay on a good day). I reckon that's how much you'd need to spend to have the screen replaced at a shop. Sadly, even if it can be determined that just the ribbon cable's faulty, this can't be replaced on its own – it's hard-wired into the screen.

When a repair costs as much as an item's worth, it's time to consider moving on. But how handy are you with a screwdriver? A new screen for the 1545 can be bought for about £35 (eBay again) – less if you go second-hand. If you're willing to fit it yourself, and if the laptop works well in all other regards and meets your needs, £35 would probably be money well spent.

Replacing a screen isn't as difficult as you might think. No special tools are required – usually just a standard cross-head screwdriver. I've done a quick YouTube search for 'dell 1545 screen replace' and there are loads of videos that'll walk you through the procedure. Even if you're a first-timer, George, you should be done and dusted – hopefully with the screen not done and busted! – inside a couple of hours.

v Replacing a laptop screen isn't especially hard – almost anyone can do it – so don't be afraid to get the screwdrivers out!

Crowdfunding Corner

This week's Kickstarter projects – one hardware, one software - are both tied to gaming greats from the past. Re-live the games you loved in two different new ways

The RetroClarity

The era of HD televisions has left retro gamers in a bit of a jam. Old graphics weren't designed for the kind of upscaling that gets applied to them, not the kind of screen temperatures they run on. This means playing with images which are fuzzy and discoloured. They were supposed to be seen on CRT screens, which are little more than a memory to most people at this point.

The RetroClarity is exactly the kind of hardware solution retro console gamers need. This plug-and-play hardware allows you to connect classic consoles to an HDTV without sacrificing video quality. Plugging into the component video input, it scales and colours your console image accurately, and is compatible with the SNES, Mega Drive, Master System and more.

The cheapest way to get an assembled unit and cables is to back the project for $85 (£54), but if you're a home electronics enthusiast you can save a little by pledging $65 (£41) for the main unit and instructions on how to build the necessary cables. Rewards are due to ship in October 2015, but the funding is tight, so if you're interested in making this hardware marvel happen, now's the time to back it!

URL: kck.st/1LoSwiv
Funding Ends: Tuesday, July 7th 2015

Shenmue III

If you're interested in this one you probably haven't missed it, but just in case: the long-awaited third instalment in the ***Shenmue*** series – that began on the Dreamcast over 15 years ago – is finally being made, and it's using Kickstarter to help gain its initial funding. Available for PC and PS4 only, *Shenmue III* is an open-world action RPG that aims to bring the series up to date with modern technologies. You can get a digital copy for as little as $29 (£18) but if you want the full retro experience you may be interested in the backer-exclusive boxed copy, which costs $60 (£38) – just like games used to!

The project is already doing fantastically – it's almost doubled its $2,000,000 goal at time of writing – but as with any Kickstarter there's no reason more money can't be helpful. There are tonnes of stretch goals that the developers are looking to hit and, if nothing else, it keeps Kickstarter and its community strong which gives the smaller guys a better chance of succeeding. The only bad thing about this Kickstarter? You'll have to wait until December 2017 to see the game – and that's assuming it stays on target, which big games almost never do. Still, with a lead time like that it sounds like they've approached it realistically, so back with confidence.

URL: kck.st/1QzU11K
Funding Ends: Saturday, July 18th 2015

Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

FotoJet

This week, we make collages. Lots of collages…

I recently had a group of photos I wanted to arrange in a pleasing collage. The few programs I have that allow me to do such things were more than capable of the job at hand, but I found myself at a computer that didn't have any photo manipulation programs installed.

To add to that, the system-wide group policies stopped me from installing anything to this PC. In short, I was a little stuck. Thankfully, though, FotoJet came to rescue and I managed to get the job done.

Online Collage Maker

As you can assume from the heading above, FotoJet is an online resource that allows you to upload images, then arrange them to make a collage, photo card or poster. Once you've got the finished product how you like, you can download the collage as a JPG or PNG image file. It's really quite simple.

Simple as it may be, though, it's also quite a powerful resource. You begin the process by choosing one of the 190-plus templates from the subsection groups. These include Modern, Classic, Art, Holiday, 3D and Creative, with photo card options for Birthday, Father's Day or Wedding.

The templates themselves are well designed, a cut above the usual MS Publisher kind of artwork or most other free examples you'll find online. Once you've picked the template, you'll be presented with a management window, where you can add photos from local or network storage or from Facebook.

Once you've picked the photos, you can manipulate their positioning on the page and where they'll sit on the template. You can even alter any of the text on the screen and choose from a vast number of fonts.

After that, you can save the finished collage as JPG or PNG, with three levels of quality and size, or you can share the image to Facebook – again with a selection of sizes. Once done, you can also work your way back to the beginning to create something else.

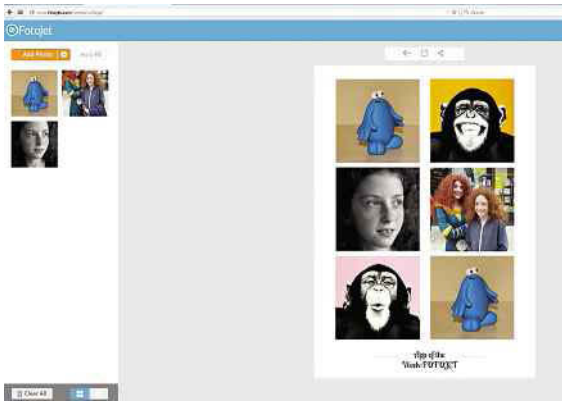
Features At A Glance

- Free!
- More than 190 templates.
- Easy to use, minimal work area and clicks needed.
- Facebook integration and sharing.

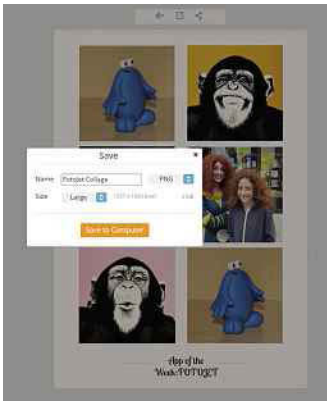
Conclusion

Considering the service is free, FotoJet is a pretty handy resource. There are better programs available, as installed apps or otherwise, with more templates, features and extras, but on the whole, FotoJet does a decent enough job, and we were pleasantly surprised with the result.

So if you're stuck for a program to install and you need to get a collage or poster done, then head on over to **www.fotojet.com** and see if it's fit for the job. **mm**



Use whatever images you like, including chimps, Berk from Trapdoor and your long-suffering children



Save your collage as a JPG or PNG or share to Facebook

FotoJet is easy, free and surprisingly powerful

Logging Off

Are video cards still interesting? There was a time in about 20 or more years ago when they were the most exciting part of the PC development curve. With one in place, suddenly your computer could things that even dedicated arcade machines and even flight simulators couldn't match.

It wasn't one of those baby steps we've seen in CPU performance or even the sizeable jumps in memory bandwidth that each new technology ushers in. The advent of Voodoo Graphics and the subsequent rise of the GPU moved computer graphics on by orders of magnitude in just a few short years. And it's continued to develop to the point where with the right equipment it's possible to navigate astonishingly detailed 3D worlds, experiencing the smooth graphics on multiple 4K displays or through a VR headset. Compared with the 8-bit era, and even 16-bit hardware, we're on another planet.

However, back to my opening question: does it still excite the average PC owner? I'm asking because even a forged-in-silicon technophile like me is having something of a hard time summoning enthusiasm for the latest R9 Fury X technology from AMD.

I can appreciate that it's quicker than the R9 290X series it replaces, that it's built for DX12 on Windows 10, and that it's a new high watermark for power/performance efficiency. Yet I'm scratching my head about what amazing software it was actually designed to challenge, because I have a R9 290 on my test rig, and I almost never play any sort of game on it.

On my working PC, where I more often play games I have an old Nvidia GTX 660, because it's more than man enough to deliver a smooth frame-rate without clobbering my electricity bill.

However, seeing in the past few weeks what improvements Intel has been making to its integrated GPUs, the future seems less rosy for the discrete GPU. Or, more specifically, a card that costs north of £500.

What's gone awry with new GPU cycle is that even the lowest specification chip can deliver smooth gaming if you turn the detail down a bit and cap the resolution. Therefore, unless you insist on having the full bells-and-whistles experience, then you don't need a Fury or anything like it.

What also hasn't helped is the attitude of the game developers, which is to generally ignore all the cleverest new features on the

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latest cards, because only a relatively small number of people have those. The list of must-have features for video cards that were never actually used is very long, and developers realised long ago that what they need to do is give the best experience for the average user.

If you look at the relatively low GPU power that both Sony and Microsoft put in their fourth-generation consoles, then it's obvious that for most game concepts, last year's GPU is more than quick enough if coded well enough.

I'm sure the technology in the Fury X and sister cards is tremendous. What I don't accept is that there's a need for either it or whatever Nvidia has planned next, based on what games developers are actually writing and those that people are playing.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: **1** Grid, **3** Ablative, **9** Annulus, **10** Yemen, **11** Incandescent, **13** Nicety, **15** Breeze, **17** Question Mark, **20** Storm, **21** Houdini, **22** Nebulise, **23** ISP's.
Down: **1** Gradient, **2** Ionic, **4** Bushel, **5** Asynchronous, **6** Immense, **7** Eons, 8 Planetesimal, **12** Weeklies, **14** Coulomb, **16** Rights, **18** Aries, **19** ISBN.

DISCLAIMER
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. When we're no slaving away to produce this magazine, and when we're not wasting time playing videogames, we also quite like to waste time watching TV shows on Netflix and Amazon Prime. We like it so much, we tend to find series that have already finished their run, and watch the entire series over a couple of months. And the latest object of our obsession is Castle, the Nathan Fillion vehicle, which sees a crime novelist teaming up with the NYPD to solve crimes, crack jokes and drink unhealthy amounts of coffee. As well as the story and the dialogue, we enjoy playing the 'He/she did it' game, which involves guessing who killed whoever got killed in a particular episode. It's something we're really getting the hang of, because it mainly pointing the finger at the very first witness who's interviewed. It doesn't always work, though, because if any series could embody the very meaning of 'deus ex machina' it's Castle. "No, the culprit isn't any of the people you've seen over the past 40 minutes; it's this random person we're introducing right now, at the very end of the episode." Does that stop us watching, though? Of course not. We've started, so we'll finish.

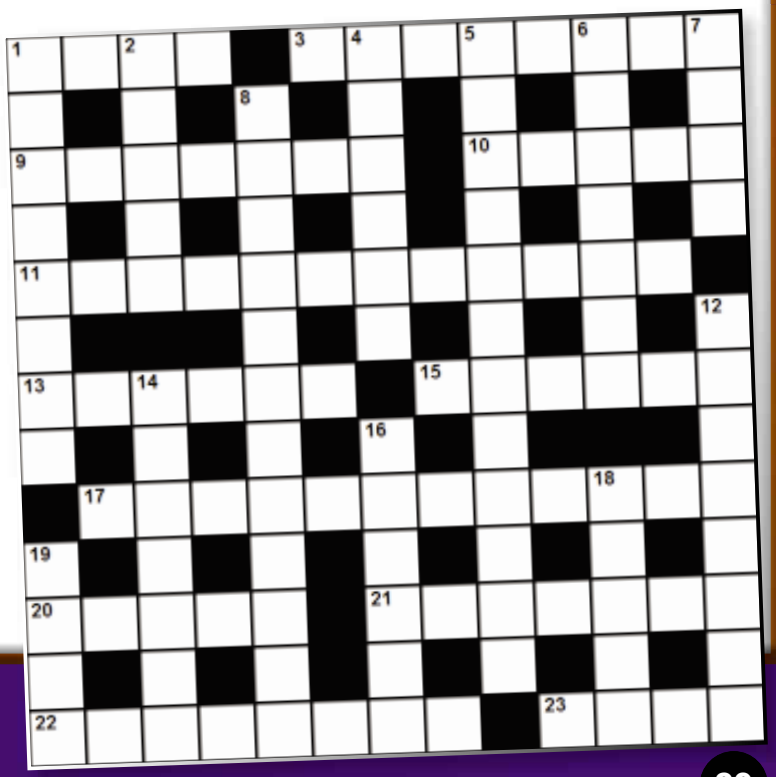
THIS WEEK'S CROSSWORD

Across

1 A periodic disturbance of the particles of a substance, which may be propagated without net movement of the particles. (4)
3 Relating to or denoting the first period of the Cenozoic era, between the Cretaceous and Quaternary periods. (8)
9 A feeling of deep and bitter anger and ill will. (7)
10 Declare invalid. (5)
11 Use of the same consonant at the beginning of each stressed syllable in a line of verse. (12)
13 An emotional wound or shock often having long-lasting effects. (6)
15 Truncated cones or pyramids. (6)
17 People that study the system of contrastive relationships among the speech sounds that constitute the fundamental components of a language. (12)
20 TO TYPE YOUR MESSAGE LIKE THIS. (5)
21 Determine or indicate the place, site or limits of, as if by an instrument or by a survey. (7)
22 States that the direction of an induced current is always such as to oppose the change in the circuit or the magnetic field that produces it. (5,3)
23 The direction towards the point of the horizon where the sun sets at the equinoxes, on the left-hand side of a person facing north. (4)

Down

1 A written assurance that some product or service will be provided or will meet certain specifications. (8)
2 A univalent chemical radical derived from ethylene (making a comeback for music recordings). (5)
4 A measure of the estimated differences between the observed or calculated values of quantities and their true values. (6)
5 Riverside entrance to the Tower Of London with a gruesome reputation. (8,4)
6 The innermost membranes that enclose the embryo of a mammal, bird or reptile. (7)
7 English philanthropist who made contributions to a college in Connecticut that was renamed in his honour (1649-1721) (4)
8 2,400 seconds. (5,7)
12 A printed record of an individual's record of cautions, arrests, convictions and prison time. (3,5)
14 Paddy the Liberal Democrat. (7)
16 A highly ionised gas composed entirely of equal numbers of positive ions and electrons. (6)
18 Post or repost something on a social media website or application. (5)
19 Lightweight database management system from Hughes Technologies. (4)



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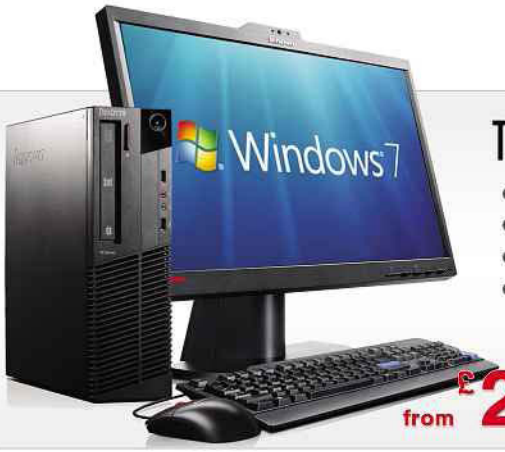

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